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Access VBA Programming

FOR DUMMIES®

by Alan Simpson

Wiley Publishing, Inc.

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About the Author

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Alan Simpson is the author of over 90 computer books on databases, Windows, Web site design and development, programming, and networking. His books are published throughout the world in over a dozen languages and have millions of copies. Alan has also taught introductory and advanced computer programming courses at San Diego State University and the UCSD Extension. He has served as a consultant on high-technology, education-oriented projects for the United States Navy and Air Force. Despite that, Alan has no fancy job title because he has never had a real job.

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Dedication

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To Susan, Ashley, and Alec, as always.

Author's Acknowledgments

Even though only one author's name appears on the cover, every book is a team project. This author would like to thank the many people who contributed to this book. To Matt Wagner and all the folks at Waterside Productions, a big thanks for helping to make it all happen. Many thanks to Terry Varveris and Christopher Morris at Wiley for their enduring patience (and Terry's relentless friendly reminders). And of course, thanks to all the people at home for putting up with the neglect while Daddy cranked out yet another book.

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Introduction

Welcome to *Access VBA Programming For Dummies*. As you (hopefully) already know, Microsoft Access is a huge database management program, offering lots of ways to manage data (information). Common uses of Access include managing mailing lists, memberships, scientific and statistical data, an entire small business, and just about anything else that involves storing and managing large amounts of information.

As the title implies, this is a book about using Visual Basic for Applications (VBA) to enhance the power of Access databases. It's not a book about creating Access tables, queries, forms, reports, and such. To stay focused on VBA, I need to assume that you already know all that. Furthermore, there's really no point in even using VBA until you've already created a database with at least some tables and forms in it. In fact, writing VBA code is usually the last step in creating a custom Access database.

Unlike other programming books that you might have seen, this one doesn't assume that you're already a programmer. I don't even assume that you're already an accomplished programmer who is just picking up a new programming language. Rather, I assume that you've never written any programming code in your life — and maybe aren't even all that sure what programming code means or how it relates to Microsoft Access.

By the time you finish this book, you'll know exactly what VBA is all about and you'll know how it fits into Access. You'll discover the meanings of all those obscure terms that programmers throw around — *code, variable, array, loop, object* — as though they were common knowledge. You'll be able to write and use your own custom code, just like programmers do.

You might have noticed there is no version number in this book's title: That is, it's not Access *2002* VBA or Access *2003* VBA. Here's why: Although many changes and improvements to Access have occurred in all the versions that Microsoft has released, the VBA programming language has hardly changed a bit over the years. The code that you see here should work as-is in Access 2000, 2002, 2003, and any subsequent versions released. The vast majority of the code in this book will also work just fine even in last century's versions, such as Access 97.

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About This Book

I wish I could say that this book is exactly like a coffee-table book, where you could just pick it up, flip to any page, and have everything make perfect sense to you. Well, I *could* say that, but I'd be lying if I did. It's not because I wanted to break from the coffee-table book idea. It's really more because some stuff in life doesn't make much sense until after you already know something else.

Here, it's not really possible to make much sense of VBA code until you understand what VBA code is and why it exists. And, we are talking about Microsoft Access VBA here. To make sense of much of anything in this book, you have to already be familiar with Microsoft Access tables, queries, forms, and reports. There just isn't enough room in this book to explain all that stuff from scratch and still have enough pages left over to talk about VBA.

On the bright side, I did everything I could to make it easy to find what you need to know, when you need to know it. It's certainly not necessary to read this book cover to cover to make sense of things. After you find the topic you're looking for, you should be able to read through the section and be done with it quickly. Often, you'll be able to skip reading altogether and get all you need to know from the pictures in that section.

Conventions Used in This Book

While I'm on the topic of using this book without boring yourself to death attempting to actually read it, I've also stuck with some conventions for displaying text in these pages. For example, any actual VBA programming code appears in a `monospace` font with a gray background, like this:

```
'VBA code to say Hello World on the screen.
Sub Hello()
   MsgBox "Hello World"
End Sub
```

When there's just a little chunk of code to show in text, like this — `Dim Wit As Date` — you can see what is and what isn't VBA code.

The ➪ symbol that you see in text separates individual menu options (commands) that you choose in sequence. For example, rather than saying *Choose New from the File menu* or *Click File in the menu bar and then click New in the drop-down menu,* I just say something like

Choose File➪New from the menu bar.

When you see something **in bold**, I want you to enter (type) that.

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What You're Not to Read

I don't think there are many people in the world who would put reading a computer book into their own personal Fun life-category. I think reading a computer book is more likely to fall into the Work or Don't category. To minimize the time you have to spend away from Fun category things, I put some information in sidebars noted with Technical Stuff icons. Those things are definitely optional reading that you're welcome to ignore.

Foolish Assumptions

I think I already covered the bases as far as foolish assumptions go in this book. To assume that only true Microsoft Access experts would even attempt to read these pages is about the most foolish assumption I could possibly make. Let's face it: Most people are totally clueless when it comes to anything having to do with Microsoft Access. Access isn't exactly an easy program for most people to learn.

But whad'ya gonna do? The title of this book says it's about Access VBA, so that's what the book is about. There just isn't any way around the thorny fact that Access VBA can only be explained to people who already know what Microsoft Access is all about. Reality rears its ugly head and refuses to duck back down.

How This Book Is Organized

All books contain a lot of information. That's what makes them books. To break things down into smaller, more manageable chunks, I split this book into five main parts, as follows.

Part 1: Introducing VBA Programming

This is all the information you need to get started. If you've already been using VBA for a few months or years, you can skim this part. If you don't know a VBA procedure from a PTA Meeting, you might want to take a closer look at Part I before venturing forth to the upcoming parts.

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Part II: VBA Tools and Techniques

Here you discover how to write VBA code to make Access do things for you. For example, you'll see how you can make Access open forms, respond to button clicks, change the appearance of objects, and more.

Part III: VBA, Recordsets, and SQL

Here you'll get friendly with tools and techniques for managing your Access tables using VBA with SQL (Structured Query Language) and recordsets. All those buzzwords make this sound more technical than it really is. But as you'll see, if you've done anything at all with queries in the past, you've already been working with SQL recordsets. The idea is the same. We just use fancier terminology in the VBA world.

Part IV: Applying VBA in the Real World

Here you'll get into some more advanced programming tricks, mostly by using techniques presented in earlier parts in new and creative ways. You'll also see how to use VBA's debugging techniques, which can be a real life-saver when things go wrong and you just can't figure out why the code you wrote isn't doing what you intended.

Part V: Reaching Out with VBA

VBA isn't a programming language solely for Microsoft Access. You can use VBA to customize all the Microsoft Offce application programs, including Microsoft Word, Microsoft Excel, and Microsoft Access. Furthermore, VBA can import data from, and export data to, a variety of formats that extend its reach even beyond Microsoft Access. Part V will show you how that's all done.

Part VI: The Part of Tens

What *For Dummies* book would complete without a Part of Tens? Ten is such a nice number to work with, given our ten fingers and all. The Ten Commandments of Writing VBA Code cover the main strategies that you can adopt to avoid going crazy trying to get VBA to do your bidding. Then there's the top 10 nerdy programming things you're most likely to want to do almost from Day 1 of using VBA. Check out Chapter 17 for more than ten shortcut

keys. I figured that if I were gonna stick some shortcut keys here, why limit it to ten? I'll splurge on those because they're easy.

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Icons Used in This Book

As you flip through this book, you'll notice little icons like these sprinkled about its pages. These icons point out little chunks of text that either deserve a little extra attention or deserve very little attention. For example, a Warning points out places where being careless could cause real problems, whereas Technical Stuff points out facts that are nice to know but not super-important. The icons are

Tips point out handy tricks or techniques that can make things easier for you.

These icons point out techniques where if you do things wrong, you might end up creating problems for yourself.

These icons point out tools and techniques that you'll use every time you use VBA. You'll want to keep these in mind because you'll use them often.

These icons point out text that describes how or why a thing works the way it does from a technical standpoint. If you just want to get a thing to work and don't care about how or why it works, you can always skip these.

Web Site for This Book

If you can find a way to copy and paste — rather than type — VBA code into your database, go for it. Much of the sample VBA code shown in this book is the kind of thing you can just drop into an Access database and start using. There's no need to retype the whole thing. Anyway, I'll post all the useful code at these Web sites:

```
www.dummies.com/go/accessvbaprog
```

```
www.coolnerds.com/vba
```

When you get to either site, you'll see where to find the code, how to copy and paste it into your own database, and a link where you can send me your questions.

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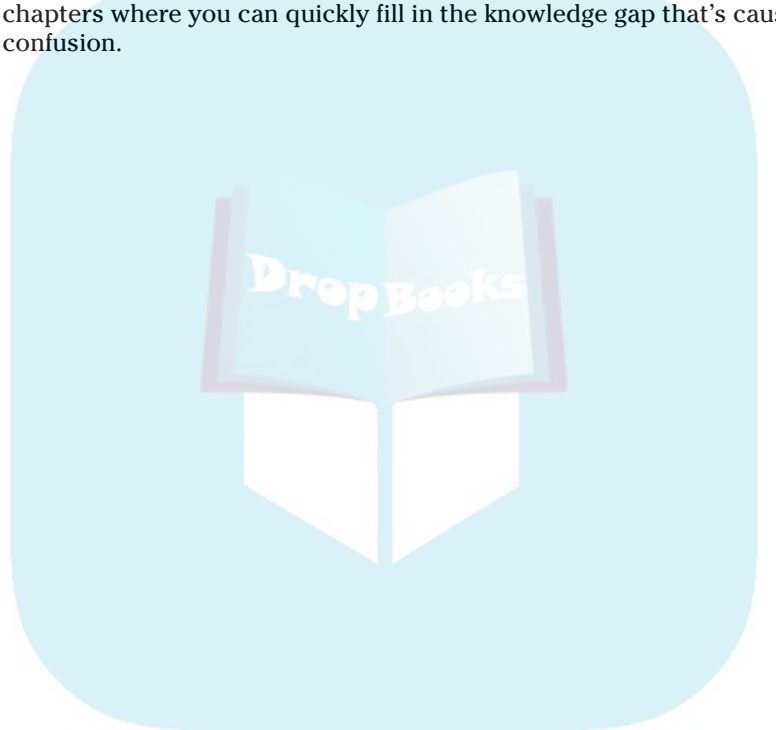
Where to Go from Here

Now that you know what this book is about and how it's organized, the next question is, "Where do I start?" Your best bet, if you're an absolute VBA beginner, is at Chapter 1. Try to slog through the first three (short) chapters to get your bearings.

Experienced VBA users can probably start anywhere that looks interesting. If you get in over your head at some point, watch for cross-references to earlier chapters where you can quickly fill in the knowledge gap that's causing the confusion.



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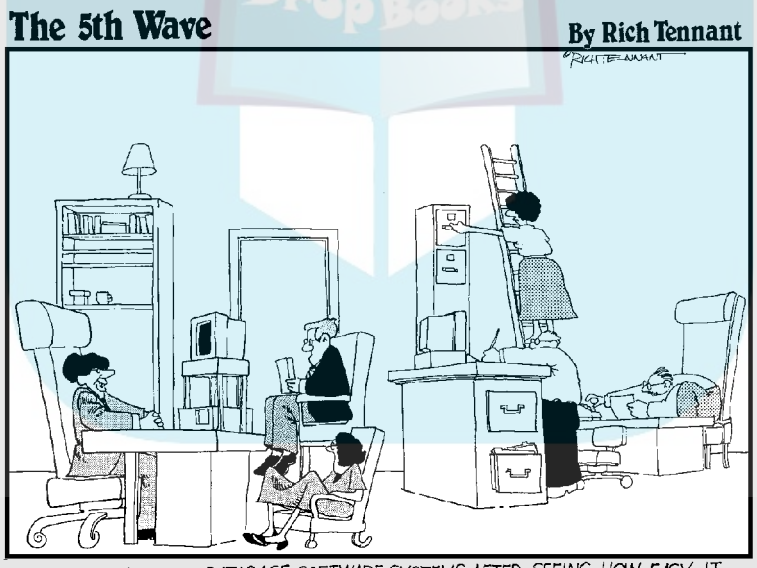
Part I

Introducing VBA Programming



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In this part . . .

VBA lets you do some pretty amazing stuff in an Access database. With VBA, you can make Access do boring repetitive jobs that you might otherwise have to do on your own. You can even get Access to do things that it couldn't possibly do on its own. Before you dive right in and try to make such things happen, you need to step back a moment and get a feel for how VBA fits into the whole Microsoft Access scheme of things. Then you need to get friendly with the tools available to you for turning ideas into stuff that actually happens when you want it to happen. I'll get through all of that in Chapters 1 and 2.

With your roadmap and toolkit in hand, you'll be ready to get into what Access VBA is really all about — writing code (also known as programming) — to make Access do exactly what you want it to do. Yes, you actually write code by typing it . . . unless, of course, you can just copy and paste the code, as is often the case. Chapter 3 is about both writing and swiping VBA code.

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Chapter 1

Where VBA Fits In

In This Chapter

- Describing Access
- Discovering VBA
- Seeing where VBA lurks
- Understanding how VBA works

This is a book about using *Visual Basic for Applications (VBA),* which is a programming language that helps you program, tweak, and squeeze productivity from Access. VBA, which is embedded in Access, is a sophisticated set of programming tools that you can use to harness the power of a packaged application like Access. Just like you need to know how to walk before you can run, you need to know Access before you can start to use Access VBA.

Maybe you want to use Access to manage a large mailing list. Maybe you need Access to manage your whole business, including customers, products, and orders. Perhaps you need to manage enrollments in courses or events. Whatever your reason for using Access, your first step will always be to create the tables for storing your data. From there, you can then create queries, forms, reports, and macros to help manage those data. All these steps take place before you even get into VBA. So in this book, I have to assume that you're already an experienced Access user who needs more than what queries, forms, reports, and macros can provide. If you're new to Access, this is not a good place to start. If you need to brush up further on Access, *Access 2003 For Dummies* (John Kaufeld, Wiley) or *Access 2003 All-in-One Desk Reference For Dummies* (Alan Simpson, Margaret Levine Young, and Alison Barrows; Wiley) would be a good place to start.

Although Access has progressed through many versions over the years, VBA has remained relatively unchanged. I used both Access 2002 and Access 2003 to create this book, but the code examples presented in this book should work fine in just about any version of Access. So now, before launching into VBA, take a moment to discuss what tables, queries, forms, and reports are all about, and how VBA fits into the overall scheme of things.

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Taking a Look at Access

Access, part of the Microsoft Office suite, is a huge database management system that you work by using modern object-oriented methods. (The term *object-oriented* stems from the fact that everything you create in Access — a table, form, report, or whatever — is considered an object.

The Access database window, as shown in Figure 1-1, is the main container in which you store all the main objects that make up a single database. The left column of the database window is the Object list, and each name in the list represents a type of object, as summarized here.

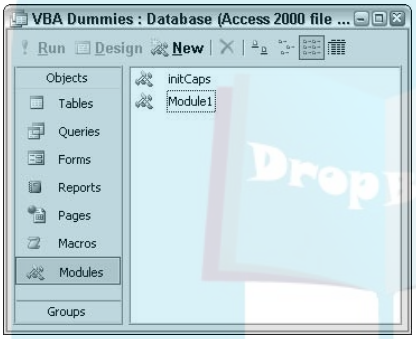

Figure 1-1: The Access database window.

- **Tables:** *Tables* contain the raw data that all other object types display and manage. Data in tables is stored in *records* (rows) and *fields* (columns).
- **Queries:** Use *queries* to sort and filter data as well as define relationships among multiple related tables.
- **Forms:** Access *forms* are similar to printed fill-in-the-blank forms, but they allow you to view and change data stored in Access tables.
- **Reports:** *Reports* are objects that define how data should be presented on printed reports.
- **Pages:** *Pages* are similar to forms, but users can access data in tables through a Web browser rather than directly through Access.
- **Macros:** *Macros* provide a means of automating certain aspects of Access without programming.

The Modules container, as you'll soon discover, is one of the places where you store VBA code. If you're not already familiar with modules, that's fine. Modules are what this book is really all about. Groups, of course, aren't really separate objects but rather just collections of existing objects. Sort of Access's version of *Favorites*.

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One of the most important things to understand is that you don't use VBA "instead of" other objects like tables and forms. You use VBA to enhance the capabilities of other object types. Therefore, it makes no sense to even try VBA until you have a firm grasp of the purpose and capabilities of those other object types in Access.

Understanding VBA

Visual Basic is a programming language — a language for writing instructions that a computer can read and process. VBA is a programming language that's specifically designed to work with the application programs in Microsoft Office including Word, Excel, Outlook, and of course, Access.

When you write text in a programming language (as opposed to writing in plan English), you're writing *code.* Programmers use the term *code* to refer to anything that's written in a computer programming language. For example, Figure 1-2 shows some sample VBA code. The whole trick to learning VBA is learning what all the various words in the language mean so that you can write code that tells Access exactly how to perform some task.

```
Public Function PCase(anyText)
    'Custom Access VBA function to fix all uppercase letters.

    PCase = StrConv(anyText, vbProperCase)

    If Left(PCase, 4) = "P.o." Then
        PCase = "P.O." & Mid(PCase, 5)
    End If

    If Left(PCase, 2) = "Mc" Then
        PCase = "Mc" & UCase(Mid(PCase, 3, 1)) & Mid(PCase, 4)
    End If

    If Left(PCase, 3) = "Mac" Then
        PCase = "Mac" & UCase(Mid(PCase, 4, 1)) & Mid(PCase, 5)
    End If

End Function
```

Figure 1-2: Some sample VBA code.

If the sample code shown in Figure 1-2 looks like meaningless gibberish to you, don't worry about it. People aren't born knowing how to read and write VBA code. Programming (writing code) is a skill you have to learn. For now, it's sufficient just to know what code looks like. Knowing what the code means is one of the skills you'll master in this book.

Because VBA code looks like a bunch of meaningless gibberish typed onto a sheet of paper, this begs the question of why anybody would want to learn to read and write some dreadful language like that. The answer to that question lies in the role played by VBA in an application like an Access database.

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Do, not die

Think of the term *execute* in the sense of *to carry out,* as in *execute a U-turn* or *execute the procedure.* Don't think of *execute* in the sense of *terminate the life of.*

The ability to use the same code over and over again is key to automating mundane tasks in Access. For example, if you used Access to print checks, you might have to manually type the part of the check where you type the amount in words, like *Ninety-two and 99/100 Dollars* for $92.99 because Access can't do that translation on its own. But if you could write some code to translate a number like $92.99 into words, you wouldn't need to type all those dollar amounts. Access would just print the correct information as it prints each check.

Access does indeed have a ton of tools that let you create a database without any programming at all. You could easily spend months or years just learning all the things you can do in Access without writing any VBA code. Yet despite the huge number of things you can do without programming, sometimes you will want your database to accomplish some task that's not built into Access. That's where VBA comes in. When you want Access to perform a task that it doesn't already know how to perform, you write the steps to be performed in the VBA programming language.

When you're writing VBA code or just looking at some VBA code written by someone else, Access doesn't do anything. Access doesn't actually perform the steps described by that code until Access executes the code. When you write VBA code, you're actually writing a set of instructions that Access can perform at any time, over and over again.

Seeing Where VBA Lurks

In an Access database, VBA code is stored in *modules.* Despite the fancy name, a module is basically an electronic sheet of paper on which VBA code is typed. The two types of modules in Access are

- **Standard module:** A page that contains VBA code that's accessible to all objects in the database.
- **Class module:** A page of code that's attached to every form and report you create. VBA code in the class module is accessible only to the form or report to which the class module is attached.

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The main difference between a standard module and a class module is one of scope. VBA code in a standard module has a *global scope,* which means that the code can be accessed by every object in the database. A class module has *local scope,* meaning that its code is accessible only to one form or one report in the database.

I talk about the issue of scope as it becomes relevant throughout this book. Right now, it's not terribly important. For now, the main thing to keep in mind is that modules contain VBA code. Now take a look at where modules are stored within an Access database.

Finding standard modules

A *standard module* contains VBA code that's accessible to every table, query, form, report, page, and macro within the current database. Like those other objects, standard modules get their own button in the Object list at the left side of the database window (refer to Figure 1-1). When you click the Modules button, the main pane shows the names of standard modules (if any) within the current database, as in the example shown in Figure 1-3.

Don't be surprised if you click the Modules button in a database, and the main pane is empty. Standard modules don't just happen: You have to create them.

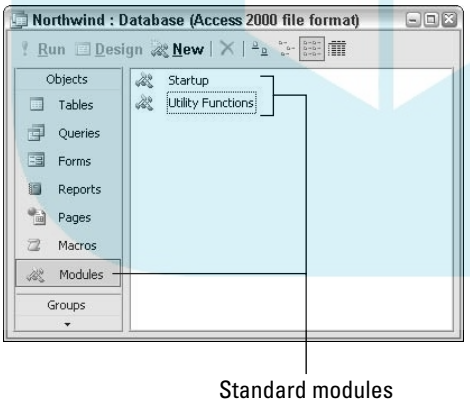

Figure 1-3: Standard modules in a database.

Finding class modules

Like standard modules, *class modules* contain VBA code that tells Access what to do. Unlike standard modules, however, you won't find any class modules in the database window. Class modules are hidden behind forms and reports in your database.

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It might help to define the term *class* as *a class of objects.* In Access, tables are one class of objects, queries are another class, forms are another class, reports are another, and so forth. Or looking at it from the other direction, a single form is an object within your database. That single form is also a member of the class of objects known as *forms.*

Class modules are not global nor public like standard modules. To the contrary, class modules are very private beasts. They bring new meaning to the concept of hermit. Not only are class modules invisible to you most of the time, but they're always invisible to each other. The VBA code in a class module is visible (and usable) only to the form or report to which the class module is attached.

I think that it helps to envision a class module as literally being hidden behind its form, as in Figure 1-4. The VBA code in the class module is always hidden from the other objects in the database. The class module might be hidden from you as well if you don't know how to find it.

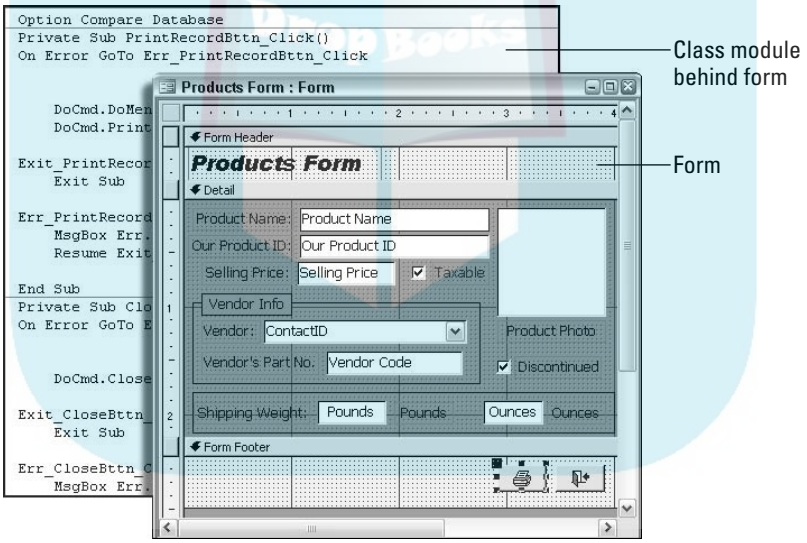

Figure 1-4: Class modules hide behind forms and reports.

You have several ways to get to a form or report's class module, as you'll discover in upcoming chapters. For now, if you just want to open a class module and have a look, here's one way to do it:

1. **In the database window, click Forms or click Reports, depending on which type of object you want to open.**

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2. **Right-click the name of any form or report and choose Design View.**

   To see the class module for the open form or report, click the Code button on the toolbar or choose View➪Code from the Access menu bar (see Figure 1-5).

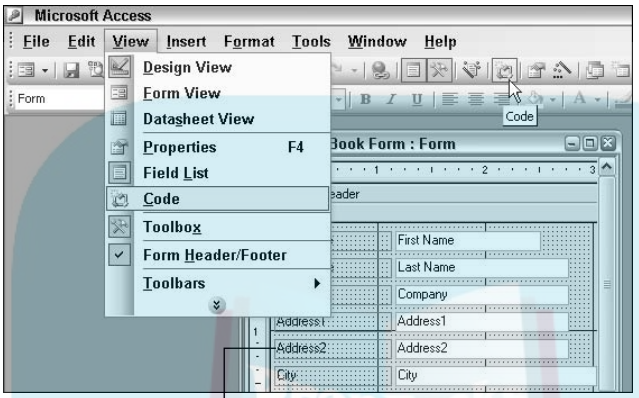

Figure 1-5: Class modules are accessible from form and reports Design views.

From VBA to Access

When you open a module, whether it's a standard module or a class module, your screen will change radically. That's because the module opens in the *Visual Basic editor*, which is a separate program window from Access. In fact, if you look on the taskbar, you'll still see a taskbar button for Access. You can switch back and forth between Access and the editor just by clicking their respective taskbar buttons, as shown in Figure 1-6.

If the module you open contains any VBA code, that code is visible in the editor Code window, also shown in Figure 1-6. A class module might contain VBA code even if you never wrote a line of VBA code in your life because some of the control wizards in the form and report Design views automatically write VBA code for you behind the scenes. But let's not get ahead of ourselves.

The main thing to keep in mind here is that every time you open a module, you will end up in that Visual Basic editor. You'll discover how to use that program in upcoming chapters. For now, the most important thing to know is how to close it and get back to the more familiar Access program window. Here are two easy ways to close the Visual Basic editor and get back to the more familiar Access program window:

- Choose File➪Close and Return to Microsoft Office Access (see Figure 1-7).
- Press Alt+Q.

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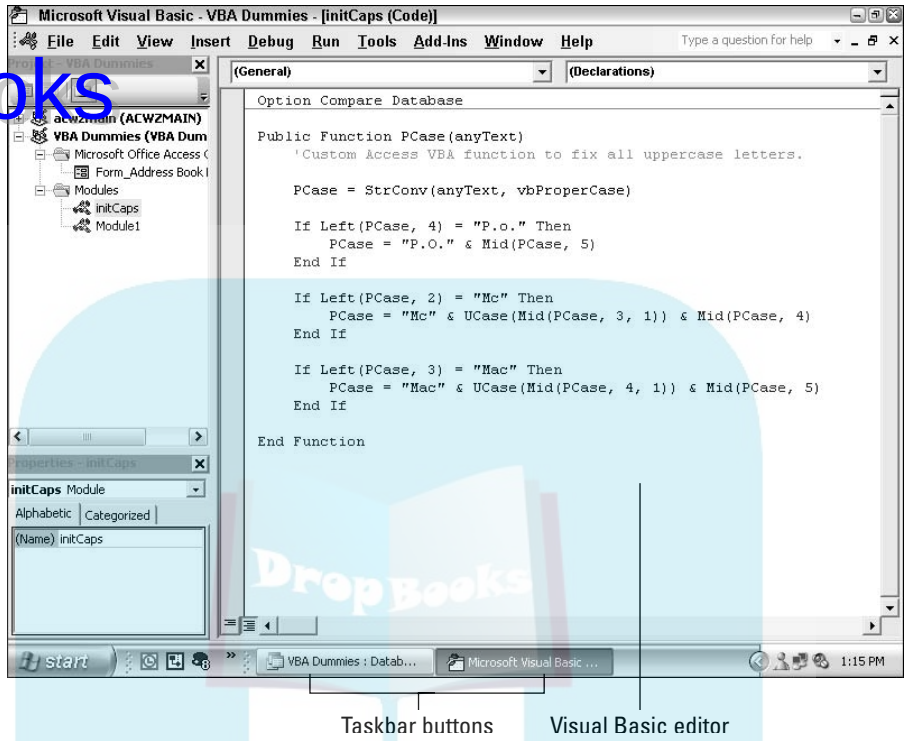

Figure 1-6: Move between the Visual Basic editor and Access.

You can press Alt+F11 to switch back and forth between Access and the VBA editor at any time.

The Visual Basic editor closes, its taskbar button disappears, and you're returned to the Access program window.

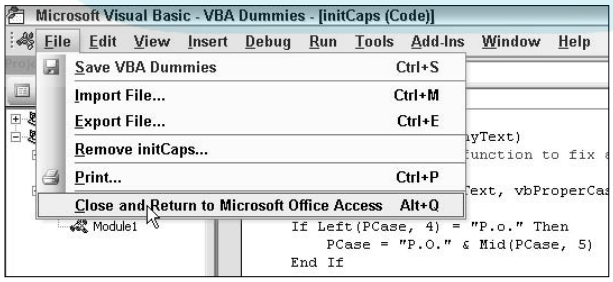

Figure 1-7: The VB editor File menu.

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Finding Out How VBA Works

When you open a standard module or class module, there's no telling exactly what you'll see inside. Some modules will be empty; others will already contain some VBA code. It all depends on the life history of the module you open. But one thing is for sure: If any VBA code is in the module, it will likely be organized into one or more procedures.

The term *procedure* in everyday language usually refers to performing a series of steps in order to achieve some goal. For example, the procedure of getting to work every morning requires a certain series of steps. The same definition holds true for VBA code. A procedure is a series of steps carried out in a specific order to achieve some desired result.

Discovering VBA procedures

A VBA *procedure* is a series of instructions written in VBA code that tells an application (like Access) exactly how to perform a specific task. In VBA code, each step in the procedure is a single line of code: a *statement.* When Access executes a VBA procedure, it does so step-by-step, from the top down. Access does whatever the first statement tells it to do. Then it does whatever the second statement tells it to do, and so forth, until it gets to the end of the procedure.

Exactly when Access executes a procedure is entirely up to you. Typically, you want to tie the procedure to some event that happens onscreen. For example, you might want the procedure to do its task as soon as someone clicks a button. Or perhaps you want your procedure to do its thing whenever someone types an e-mail address into a form. I talk about how that all works in Chapter 6. For now, just realize you can tie any procedure you create to any event you like.

Why would my database contain code?

Those of you who've never written any code might be wondering how any database you've created could possibly contain code. The answer to that riddle lies in the Control Wizards button in the forms and reports Design views.

When you use a Control Wizard to add a button or certain other types of controls to a form, the Control Wizard actually writes VBA code for you. It stores that code in the class module that's hidden behind the form (or report) module.

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When the event to which you've tied your procedure occurs, Access *calls* the procedure. What that really means is that Access does exactly what the VBA code in the procedure tells it to do. You can envision the process as in Figure 1-8 where

1. **An event, such as clicking a button, calls a procedure.**
2. **Access executes the first line in the called procedure; then it executes the second line in the procedure, and so on.**
3. **When Access encounters the end of the procedure (which will be either `End Sub` or `End Function`), it just stops executing code and returns to its normal state.**

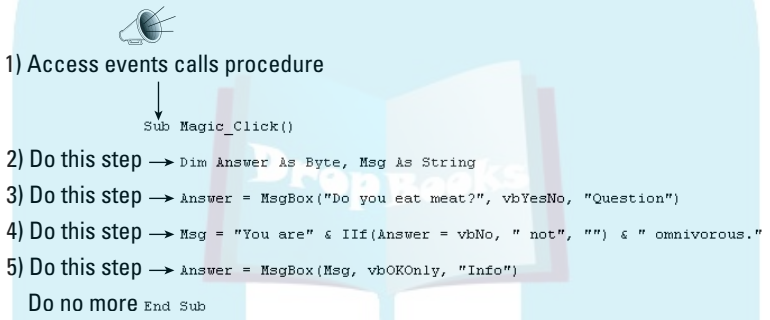

Figure 1-8: Executing a procedure.

If you think of a line of VBA code as a sentence containing words, a procedure would be a paragraph, containing more than one sentence.

Recognizing VBA procedures

VBA has two types of procedures. One type is a `Sub` procedure. A `Sub` procedure is always contained within a pair of `Sub...End Sub` statements, as follows:

```
Sub subName(...)
   'Any VBA code here
End Sub
```

The *`subName`* part of the example is the name of the procedure. The `(...)` part after the name could be empty parentheses or a list of parameters and data types. The *`'Any VBA code here`* part stands for one or more lines of VBA code.

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When looking at code that's already been written, you'll see that some `Sub` procedures have the word `Public` or `Private` to the left of the word `Sub`, as in these examples:

```
Private Sub subName(...)
   'Any VBA code here
End Sub

Public Sub subName(...)
   'Any VBA code here
End Sub
```

`Public` or `Private` defines the *scope* of the procedure. Neither is particularly important right now. All that matters right now is that you know that a `Sub` procedure is a chunk of VBA code that starts with `Sub` or `Private Sub` or `Public Sub` statement and ends at the `End Sub` statement.

For those of you who must know right now, a `Public` procedure has global scope (is available to all other objects). A `Private` procedure is visible to only the procedure in which it's defined. For example, `Sub` procedures in a class module are private to the form or report to which the class module is attached.

The second type of procedure that you can create in Access is a `Function` procedure. Unlike a `Sub` procedure, which performs a task, a `Function` procedure generally does some sort of calculation and then returns the result of that calculation. The first line of a `Function` procedure starts with the word `Function` (or perhaps `Private Function` or `Public Function`) followed by a name. The last line of a `Function` procedure reads `End Function`, as illustrated here:

```
Function functionName(...)
   'Any VBA code here
End Function
```

A module can contain any number of procedures. When you open a module, you might at first think you're looking at one huge chunk of VBA code. But in fact, you might be looking at several smaller procedures contained within the module, as illustrated in the example shown in Figure 1-9. Notice how each procedure within the module is separated by a black line that's the width of the page.

So that's the bird's-eye view of Microsoft Access and VBA from 30,000 feet. Just remember that VBA is a programming language that allows you to write instructions that Access can execute at any time. You can write different sets of instructions for different events. Each set of instructions is a procedure, which is a series of steps carried out in a particular sequence to achieve a goal. You write and edit VBA code in the VBA editor.

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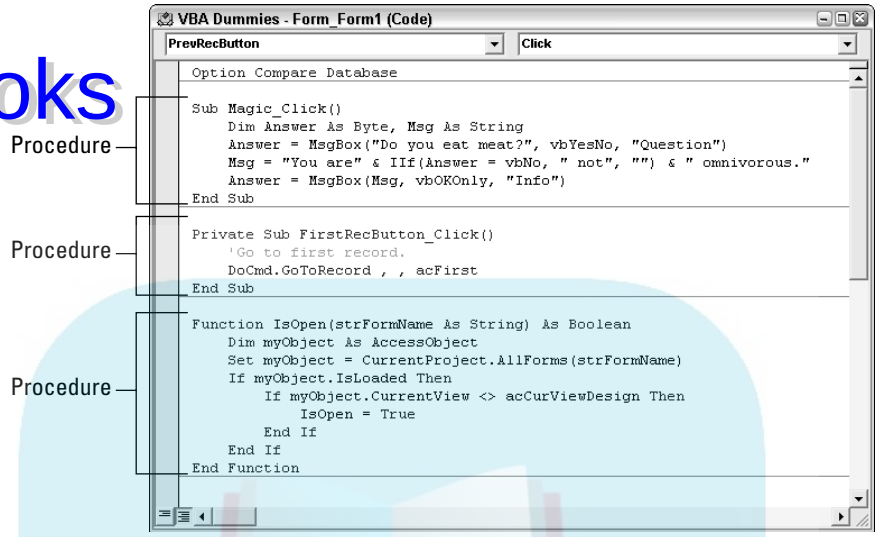

Figure 1-9: A module containing three procedures.

The beauty of it all is that you can write lots of little procedures to handle some of your more mundane tasks automatically and effortlessly. You can also extend Access's capabilities by writing procedures that do the tasks Access can't do on its own.

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Chapter 2
Your VBA Toolkit

In This Chapter

- Using the Visual Basic editor
- Understanding references and object libraries
- Using the Object Browser

As I discuss in Chapter 1, any time you want to work with Access VBA code, you need to open (or create) a module. As soon as you open a module, you're taken to a program window that's separate from the Access program window. The program that opens and allows you to create or edit VBA code is the Visual Basic editor (or VBA editor).

It might seem strange that a whole separate program window opens each time you want to write or edit VBA code, but here is why: VBA is the programming language for all the application programs in Microsoft Office. Whenever you want to create or edit VBA code in any Microsoft Office program window, you use the same Visual Basic editor. Read through this chapter for all the buzzwords and skills needed to work in the Visual Basic editor.

Using the Visual Basic Editor

The *Visual Basic editor* — where you write, edit, and test your VBA code — contains lots of optional tools and panes. There are so many of them, in fact, that I can't even tell you exactly how the editor will look on your screen the first time you open it. However, it will likely contain at least some of the components in Figure 2-1.

Like most program windows, the Visual Basic editor has a title bar and menu bar at the top. Optional toolbars appear under the menu bar. You can hide or show any toolbar at any time. Choose View➪Toolbars from the menu bar, and then select the check box of the toolbar you want to show or hide.

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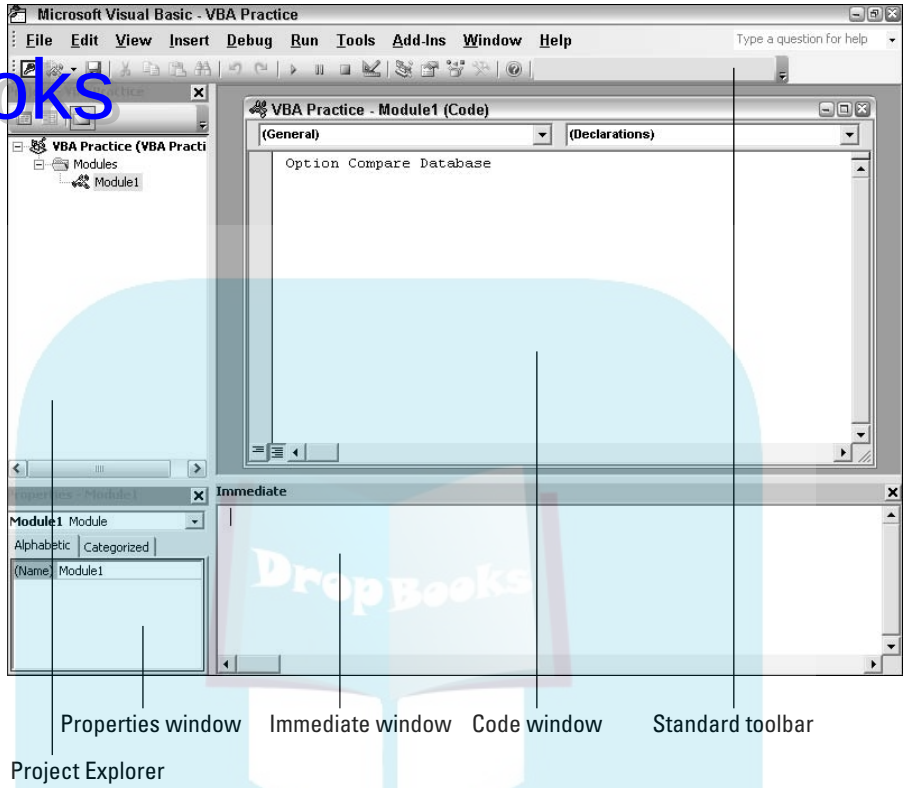

Figure 2-1: Some of the VBE optional panes.

The View menu also provides options for making the various panes shown in Figure 2-1 visible. For example, if the Immediate window isn't visible, choosing View➪Immediate Window from the menu bar makes it show. To close an open pane or window inside the VBA editor, click the Close (X) button in the upper-right corner of the pane that you want to close.

In Figure 2-1, the optional panes are currently *docked* (attached) to the VBA editor program window. You can undock any pane and change it to a free-floating window. Just drag the item's title bar toward the center of the program window and release the mouse button. For example, Figure 2-2 shows the Project Explorer pane still docked and the Properties window undocked. The title bar for each item is also pointed out in the figure.

If you undock an item, you can generally re-dock it by dragging it back to any edge of the VBA editor program window. If the item refuses to dock, try right-clicking within the item and choosing Dockable from the contextual menu that appears. Then drag the item to an edge or border if it doesn't dock right on the spot.

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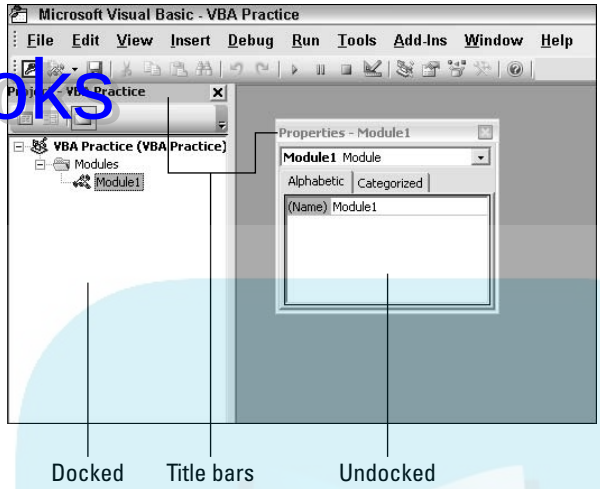

Figure 2-2: Examples of docked and undocked panes.

You can size any pane (or free-floating window) by dragging any edge of the item. For example, when both the Project Explorer and Properties panes are docked, you can widen or narrow them both by dragging the right edge of the pane. Drag the bottom edge of a pane to make it taller or shorter.

Whether you really need all the panes open depends on what you're doing at the moment within the VBA editor. You'll probably spend the vast majority of your time in the Code window. Before I discuss that window, take a quick look at the optional Project Explorer and Properties window.

Using Project Explorer

Project Explorer provides a list of all the modules contained in the current database (which is whatever database happens to be open in Access at the moment). The Toggle Folders button in the Project Explorer toolbar determines how the module names are displayed. When the Toggle Folders button is turned on, module names are shown in two separate folders as follows.

As in all programs, you can point to any button in Access to see its name. The Toggle Folders button is the third one from the left in the Project Explorer's toolbar.

- **Microsoft Office Access Class Objects:** Lists the names of all class modules in the current database. The name of the class module is the same as the form or report name, preceded by Form_ or Report_.
- **Modules:** Lists the names of all standard modules in the current database.

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If either folder has a plus (+) sign next to its name, you can click that + to view objects within the folder. Conversely, clicking the minus (–) sign next to either folder name collapses the folder and hides its contents.

To open a module in the VBA editor, just double-click its name in Project Explorer. Each module that you open will open within its own Code window (described a little later in the section, "Using the Code window").

For class modules, Project Explorer also provides quick access to the form or report to which the module is attached. Just right-click any class module name and choose View Object. The form or report opens in Design view in Access. The VBA editor might then be covered by the Access window. However, the editor is still open, so you can get back to it by clicking its taskbar button.

The buttons to the left of the Toggle Folders button — View Code and View Object — also provide a means of switching between a class module and the object to which it's attached. Press Alt+F11 to switch back and forth between the Access and VBA editor program windows.

Using the Properties window

The Properties window in the VBA editor can be quite perplexing because it displays the properties of whatever object is currently selected in Access. If nothing is currently selected in Access, the Properties window might show nothing. That's often the case when you're working with standard modules because standard modules aren't tied to any particular object or event.

To illustrate how things tie together, Figure 2-3 shows a portion of a form, in Design view, in Access. One button on the form is currently selected. In the VBA editor window, which also appears in Figure 2-3, the properties for that selected button appear in the VBA editor Properties window.

In that same figure, you see an example of how Project Explorer might look in a database that already contains some modules. The modules whose names begin with the word Form_ are all class modules that are attached to forms in that database. The names Module1 and My Standard Module refer to standard modules in that same database.

Perhaps the most important thing to remember about Project Explorer and the Properties window is that they are optional, and you really don't need them taking up space in your VBA editor when you're not using them. Most of the time, you probably won't use them. So feel free to close those panes and forget about them if they just get in the way and confuse matters for you.

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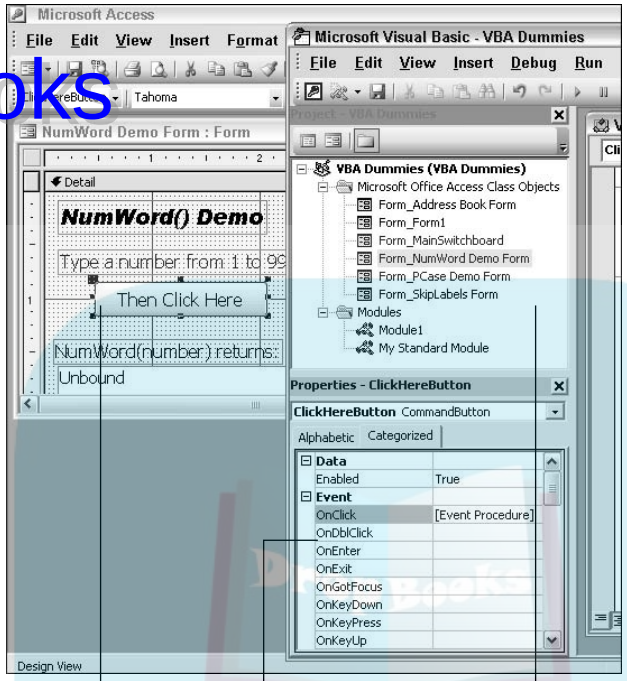

Selected object on an Access form

VBA Properties window shows properties of selected Access object.

VBA Project Explorer lists all modules in the current database.

Figure 2-3: A sample Properties window and Project Explorer.

Using the Immediate window

The Immediate window in the Visual Basic editor allows you to run code at any time, right on the spot. It's sometimes referred to as the *debug window* because it's mainly used for testing and *debugging* (removing errors from) code. If the Immediate window isn't open in the Visual Basic editor, you can bring it out of hiding anytime by choosing View➪Immediate Window from the editor's menu bar.

When the Immediate window is open, you can anchor it to the bottom of the Visual Basic editor by dragging its title bar to the bottom of the window. Optionally, you can make the Immediate window free-floating by dragging its title bar up and away from the bottom of the Visual Basic editor's program window. You can also dock and undock the Immediate window by right-clicking within the Immediate window and choosing Dockable.

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The Immediate window allows you to test expressions, run VBA procedures you've created, and more. You'll see practical examples throughout this book. But just to get your feet wet, test this simple expression in the Immediate window. Just bear in mind that an Access expression is any formula. For example, the simplest expression in the world is probably 1+1, which (as just about everyone knows) results in 2.

To test an expression in the Immediate window, do the following:

1. **Click inside the Immediate window.**

   You need your cursor in that pane.

2. **Type a question mark (?) followed by a space and the expression you want to test; then press Enter.**

   For example, click in the Immediate window and then type **? 1+1**.

   The Immediate window immediately shows you the result — 2 — as in Figure 2-4.

Figure 2-4: Testing a simple expression in the Immediate window.

You might think of the ? mark character at the start of the line as asking the Immediate window "What is?" For example, if you think of `? 1+1` as meaning "What is one plus one?", then it stands to reason that the Immediate window would return 2. After all, 1+1 is 2!

When you start actually writing VBA code, you'll use the Immediate window to test and debug your code. For now, just know that the Immediate window is another optional pane in the Visual Basic editor that you can show and hide on an as-needed basis.

Using the Code window

The VBA editor's Code window is where you write, edit, and view VBA code. The Code window is similar to a word processor or text editor in that it supports all the standard Windows text-editing techniques. For example, you can type text or use the Backspace and Delete keys to delete text. And just like in

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Word, press the Tab key to indent text, select text by dragging the mouse pointer through it, and copy and paste text (to and from the Code window). In short, the Code window is a text editor.

Like all panes in the Visual Basic editor, the Code window can be docked or undocked. Choosing one view or the other is just a matter of personal preference and won't affect how you write and edit VBA code. You can easily switch between docked and undocked views.

When the Code window is undocked, it has its own title bar and can be moved and sized independently. To dock an undocked Code window, click the Code window's Maximize button (as shown in Figure 2-5).

When the Code window is docked, it fills the available space in the VBA editor window, and its Minimize, Restore, and Close buttons appear near the upper-right corner of the VBA editor's program window. Clicking the Code window's Restore Window button (also shown in Figure 2-5) undocks the Code window and allows it to float freely.

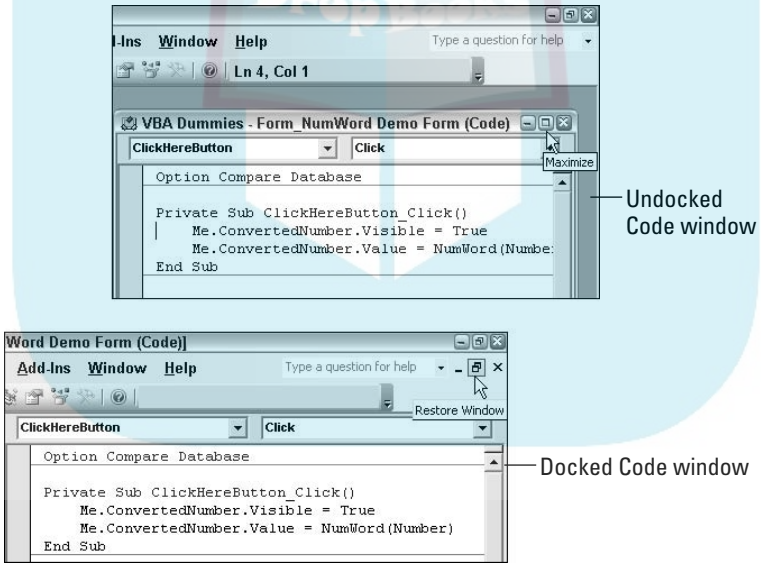

Figure 2-5: Code window Restore Window and Maximize buttons.

As I mention earlier, the Code window is really a small word processor or text editor. But word processors tend to be oriented around paragraphs of text, whereas the Code window is built for typing individual lines of code. Unlike a word processor — where you don't press Enter until you get to the end of a paragraph — in the Code window, you press Enter at the end of each line you type.

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When you type a line of VBA code and press Enter, the VBE compiles that line of code. For now, you can think of compiling as testing the line of code to see whether it will work. If you just type some line at random in the Code window — or even if you try to type a legitimate line of VBA code but make a mistake — you'll see a compile error message, as in Figure 2-6.

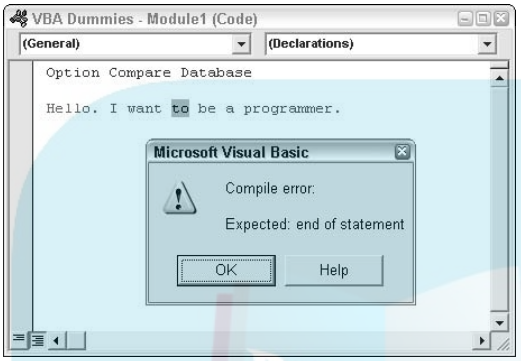

Figure 2-6: Compile error in the Code window.

I talk about ways of dealing with compile errors when I really get into writing code in Chapter 3. For now, just realize that if you type anything other than a valid line of VBA code into the Code window, you'll see a compile error message as soon as you press Enter. So you don't want to waste your time trying to type text at random into the Code window.

Referring to Objects from VBA

VBA is able to control objects in Access (and other programs in Microsoft Office) because of *Automation* (with a capital A) technology. The idea behind Automation is this: A program, database, document, or some special capability *exposes* (makes available) its objects through an *object library*. The object library contains an organized set of names that VBA can refer to when it wants to manipulate some object.

Think of an object library as sort of a steering wheel that's sticking out of some database or some program. When the steering wheel isn't available, VBA can't manipulate objects in the program. However, when the steering wheel is exposed, VBA can manipulate objects inside that program. As I discuss in a moment, you control which steering wheels are available by setting references to object libraries.

Figure 2-7 shows a hypothetical example where the Access and Excel object models (steering wheels) are exposed. VBA can therefore manipulate objects in those programs. In that same figure, Word and PowerPoint aren't exposing their objects, so VBA can't manipulate objects in those programs.

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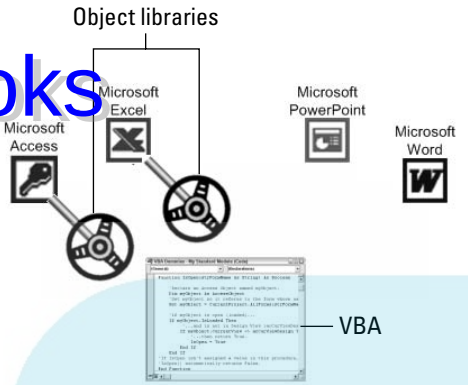

Figure 2-7: Object libraries expose objects to VBA.

Not all object libraries expose objects in specific Office programs. Some object libraries expose programs; some object libraries expose documents. Still others expose technologies that simply help you bridge the gaps between programs. Access, by itself, offers several object models. The important point is, though, that before you start writing VBA code, you need to know what object libraries are available to you.

Setting References to Object Libraries

To manipulate the objects in an object model through VBA, you need to set a reference to the appropriate object library. That part is easy because you just have to put a check mark next to the appropriate object library's name in the References dialog box. To open the References dialog box and choose your object libraries, follow these steps (in the Visual Basic editor program window):

1. **Choose Tools➪References from the Visual Basic editor menu bar.**

   The References dialog box, as shown in Figure 2-8, opens.

2. **To set a reference to an object library, select its check box.**

   Some object libraries will already be selected (checked), as in Figure 2-8. The selected object libraries in Figure 2-8 are typical and a good starting point for any Access VBA programming.

3. **When all the object libraries you need are marked, click OK to close the dialog box.**

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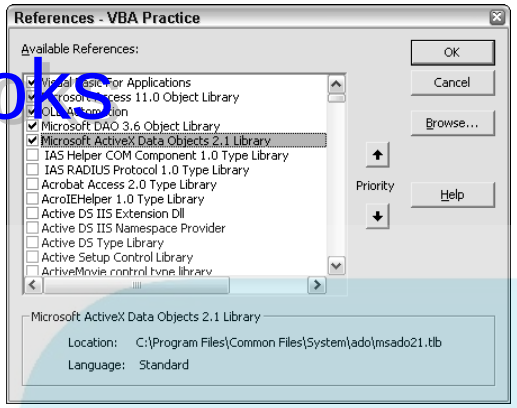

Figure 2-8: Set object library references here.

Setting references to object libraries exposes objects to VBA immediately, but it doesn't expose anything to you. At least, not in a way that's readily apparent onscreen. To find out what objects are available to VBA (and you) at the moment — and get help with them all — you need to use the Object Browser.

Using the Object Browser

Every object library provides VBA with a very large set of names that represent objects that VBA can manipulate . . . so many names that I doubt anybody would even attempt to remember them all. To make it easy to find names of things on an as-needed basis, VBA provides the Object Browser tool.

In this context, *browser* has nothing to do with the Internet or the World Wide Web. Rather, the Object Browser is a tool for browsing the contents of all available object libraries. And those object libraries have no connection to the Internet.

While you're in the Visual Basic editor, you can do any of the following to open the Object Browser:

- Choose View➪Object Browser from the Visual Basic editor menu bar.
- Press F2.
- Click the Object Browser button on the VBA editor's Standard toolbar.

When the Object Browser opens, it won't look like any big help, but there will be plenty of times when you need to use it. Now is a good time to become familiar with how you work that darn thing. Figure 2-9 points out the names of various tools within the Object Browser. A brief description of each tool follows.

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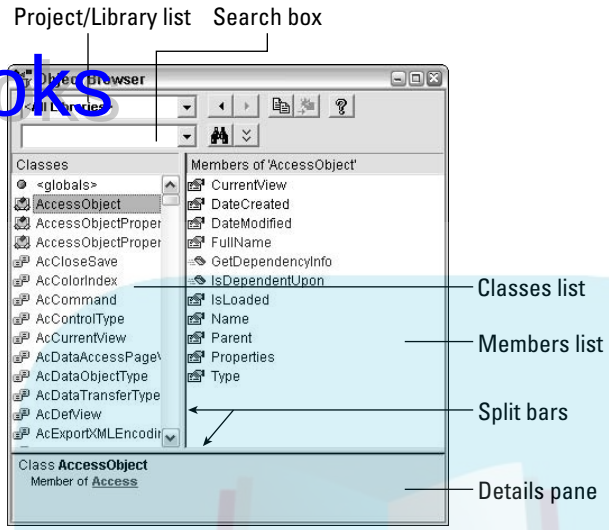

Figure 2-9: The Object Browser.

- **Project/Library list:** From here, you choose either a single object library to browse or <All Libraries> (where All Libraries really means *all object libraries that are selected in the Reference dialog box*).
- **Search box:** Here you type or choose a name to search for.
- **Classes list:** This shows the names of all classes in the currently selected object library or all available libraries if <All Libraries> is selected in the Project/Library list. A *class* is any class or group of objects, such as `AllForms` (all the forms in the current database).
- **Members list:** When you click a name in the Classes list, this pane shows the members (objects, properties, methods, events, functions, and objects) that belong to that class.
- **Details pane:** When you click a member name in the Members list, the Details pane shows the *syntax* (rules) for using the item that's selected in the Members list, as well as the name of the library to which the member belongs.
- **Split bar:** Drag the split bar left or right to adjust the size of the panes. (Drag any edge or corner of the Object Browser window to size the window as a whole.)

Clicking the Project/Library drop-down list displays the names of all currently loaded object libraries (all the object libraries to which you've set a reference in the References dialog box; refer to Figure 2-8), as follows:

- **Access:** Refers to the Microsoft Access 11.0 Object Library. This lets you control the Access program (menus bars and such) programmatically.

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- **ADODB:** Refers to the Microsoft ActiveX Data Objects 2.1 Library. This object library allows you to access all data in your database as well as data from outside databases.
- **DAO:** Refers to the Microsoft DAO 3.6 Object Library. This is an older version of ADODB, mainly used for compatibility with older versions of Access.
- **stdole:** Refers to the OLE Automation object library (where *stdole* is short for *standard OLE*). Provides programmable access to objects that use object-linking and embedding technologies, such as pictures in tables.
- **VBA:** Refers to the Visual Basic for Applications object library. This library contains programmable access to objects built into the VBA programming language, such as functions for doing math with dates, times, and dollar amounts.

In addition to the names of object libraries selected in the References dialog box, the Project/Library list offers the name of the database you're working in. Consider the name of the current database to be the Project in the Project/Library drop-down menu. You don't need to set a reference to that object library because it's built into the database that's currently open in Access.

Searching the Object Library

The real beauty of the Object Browser lies in its ability to help you find information about an object on an as-needed basis. Because you probably won't know what library an object resides in, choose <All Libraries> from the Project/Library drop-down list before you begin a search. Then you need to know what name you're searching for.

For example, as you can discover a little later in this book, Access offers a `DoCmd` (do command) object that lets VBA perform any option (command) on any menu in Access's menu bar. Suppose you're writing some code and need some quick information about that object. You could get that information by searching the Object Browser as follows:

1. **In the Search box of the Object Browser, type the word you're searching for.**

   For example, to search for information on the `DoCmd` object, type the word **DoCmd** as the word to search for.

2. **Click the Search button (binoculars) next to the Search box.**

   The results of your search appear in a Search Results pane under the Search box.

3. **To get help with an item in the Search Results pane, click a name there and then click the Help (question mark) button on the Object Browser toolbar.**

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The Help text appears in a separate Help window, as in the example shown in Figure 2-10.

Admittedly, the Help text is technical documentation, written more for programmers than for VBA beginners. But you won't be a beginner for long, and knowing how the search the Object Browser will soon become a valuable skill.

Like other tools that I describe in this chapter, you can close the Object Browser (as well as any open Help window) at any time by clicking its Close (X) button.

I suppose right about now you're wondering how any of the tools in this chapter will make your life easier. I'm working up to that. For now, just being aware of the various panes and windows in the VBA is a good start. Knowing that VBA works by manipulating objects in object libraries is a good thing too. Even just being aware that the Object Browser and Help windows exist will be valuable as you start writing code.

Writing code is the actual programming part of VBA. You write VBA code to automate activities. And you automate activities by manipulating objects via object libraries. It's a lot of fancy buzzwords. But if you just think of object libraries as steering wheels that VBA can grab onto and steer, you'll be ahead of the game. Hop to Chapter 3 to start writing code.

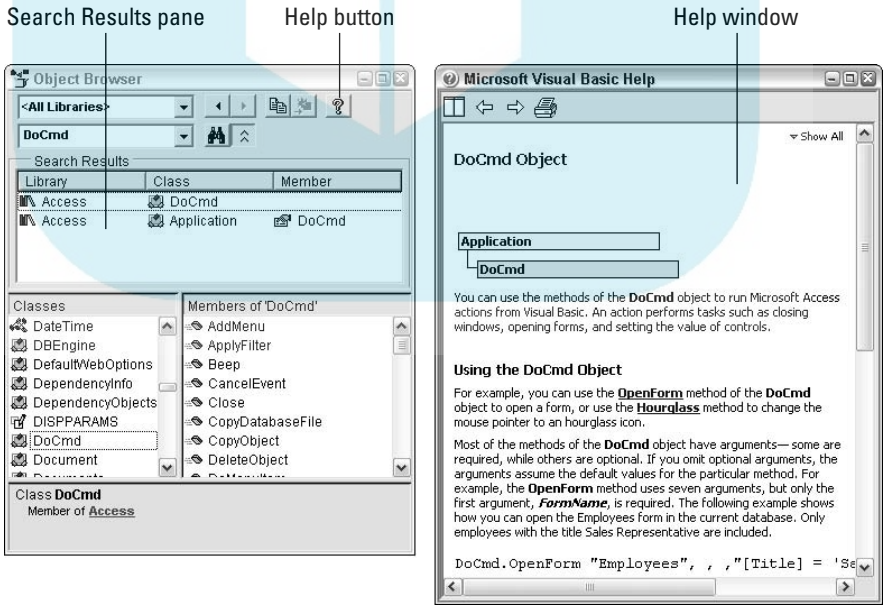

Figure 2-10: Search the Object Browser for help.

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Chapter 3

Jumpstart: Creating a Simple VBA Program

In This Chapter

- Creating a standard module
- Creating procedures
- Getting help with VBA keywords
- Modifying existing code

Visual Basic for Applications (VBA) is a programming language for writing instructions that tell Office applications — like Access — the steps needed to perform a task. You store code in Access modules. The tool that you use to create and edit VBA code is the Visual Basic editor, which opens automatically whenever you open an Access module. (If you need a refresher on the basics of the Visual Basic editor, hop back to Chapter 2.)

In this chapter, I get into some of the nitty-gritty of what's really involved in writing VBA code within Access. You'll discover how to create a module in Access and how to create procedures within a module. You'll also read about VBA *syntax,* which defines the rules you need to follow when writing a VBA statement.

Creating a Standard Module

Before you start writing code, you need a place to put it. Putting your code in standard modules is always a good bet because code in standard modules is accessible to all objects within a database. Creating a new standard module is easy. Just follow these steps:

1. **In your Access database, click Modules at the left side of the database window.**
2. **Click the New button, as shown in Figure 3-1.**

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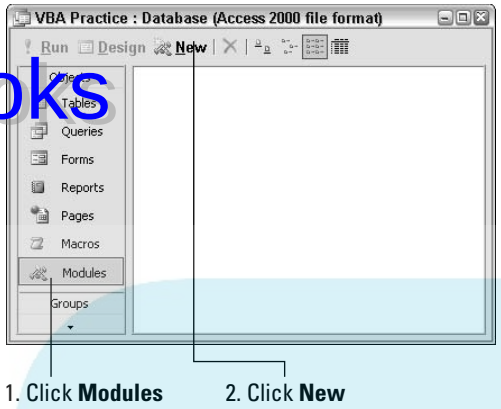

Figure 3-1: Begin by creating a new standard module.

The new module will open in the VBA Editor. Most likely, it will be empty except for the words `Option Compare Database` at the top. That line, a *module-level declaration,* just tells VBA that when comparing values, it should use the same rules as the rest of the database. You don't need to change or remove that declaration line.

As I discuss in Chapter 1, a *module* contains VBA code that's organized into one or more procedures. A *procedure* is simply the set of steps needed to perform some task. A new standard module contains no procedures because it's empty. Thus, the first step to writing code is to create a procedure.

Creating a Procedure

Adding a procedure to a module is a fairly simple task. The procedure that you create can be either a `Sub` procedure or a `Function` procedure. For now, it's sufficient to know that a `Sub` procedure is like a command on a menu: When called, it just does its job and doesn't return anything. A `Function` procedure, on the other hand, is more like a built-in function in that it returns a value. However, the steps for creating either type of procedure are the same:

1. **In the VBA editor, choose Insert➪Procedure.**

   The Add Procedure dialog box opens. All steps to follow take place in the Add Procedure dialog box.

2. **Type in a name for your procedure.**

   The name must begin with a letter and cannot contain any blank spaces or punctuation marks. To create a practice procedure, enter a simple name like **mySub**.

3. **Choose the type of procedure you want to create (`Sub` or `Function`).**

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For your first practice procedure, choose Sub. The remaining options you can ignore; the default settings are fine.

4. **Click OK.**

   The Add Procedure dialog box closes. Your module contains a new procedure with the name that you provided in Step 2.

The two lines of VBA code needed to define the new procedure are typed into your module as soon as you click OK. The first line begins with `Public Sub` or `Public Function`, followed by the procedure name and a pair of closed parentheses. For example, if (in the Add Procedure dialog box) you create a `Sub` procedure named `mySub`, the following VBA lines are added to your module:

```
Public Sub mySub()

End Sub
```

The `Public` keyword at the start of each procedure defines the *scope* of each procedure. By default, procedures in a standard module are *public,* meaning that they're visible to all objects in the current database. In a standard module, you can omit the `Public` keyword and just begin the line with the `Sub` or `Function` keyword. Either way, the module will be public (visible to all objects in the database).

In the module, the procedure name always ends in a pair of closed parentheses, as in `mySub()` or `myFunc()`. The parentheses are required, so they're typed in automatically when you click OK in the Add Procedure dialog box. Each procedure ends with an `End Sub` or `End Function` statement.

Figure 3-2 shows an example where I used the Add Procedure dialog box (twice) to create a `Sub` procedure named `mySub` and a `Function` procedure named `myFunc`. The module is visible in the VBA editor's Code window.

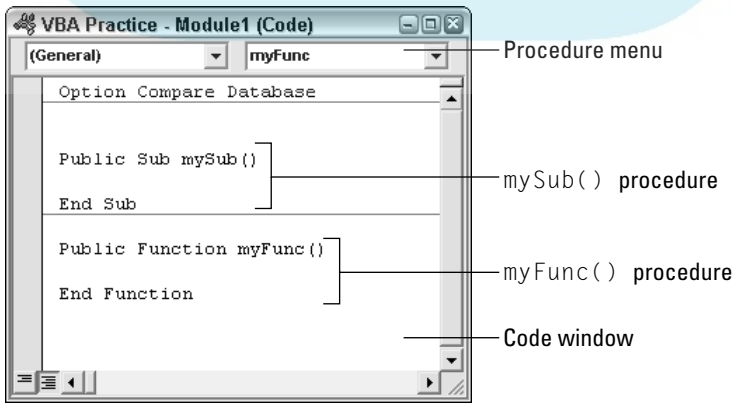

Figure 3-2: Sub and Function procedures in a standard module.

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Any code that you type into the procedure must be typed between the two lines that define the procedure. You can easily position the cursor within any procedure by clicking within that procedure. You can also move the cursor into a procedure just by choosing the procedure's name from the Procedure menu in the Code window.

Understanding Syntax

Writing code is the art of programming the computer to perform a specific procedure by defining each step in the procedure as a single VBA statement. For the code to work, every VBA statement must conform to rules of *syntax,* which define exactly how the code is written. The syntax of a VBA statement is the set of rules that define the exact order of words and where spaces, commas, parentheses, and other punctuation marks are required.

Like a spoken language, the VBA language consists of words *(keywords),* punctuation marks (for example, commas), and blank spaces. Keywords are plentiful, and each has its own specific rules of syntax. The syntax rules are so rigid that you'd never be able to figure them out by guessing. You have to know how to get the information you need, when you need it.

The VBA editor provides several tools to help with syntax. For example, you use the `MsgBox()` keyword in VBA to display a custom message onscreen. Imagine that you already know about the `MsgBox()` function and were about to use it in a program, and you type the following into a procedure:

```
x = MsgBox(
```

As soon as the VBA editor sees the `MsgBox(` part, it shows a Quick Info screen tip for the `MsgBox` keyword, as in the example shown at the top of Figure 3-3. The Quick Info tip is actually a small syntax chart showing you the rules for using `MsgBox` correctly. Within the Quick Info tip, the bold-italic word ***Prompt*** means that you're expected to type a prompt next.

For the sake of example, suppose you type **"Hello World"** (with the quotation marks) and a comma into the line:

```
x = MsgBox("Hello World",
```

The comma lets the VBA editor see that you've typed a valid first argument and are now ready to type the second argument. The second argument in the syntax chart (`[`*`Buttons As`* `vbMsgBoxStyle = vbOKOnly]`) is then bold-faced to indicate that you now should type the second argument. Also, a list of meaningless-looking names appears, called *constants,* as in the bottom half of Figure 3-3.

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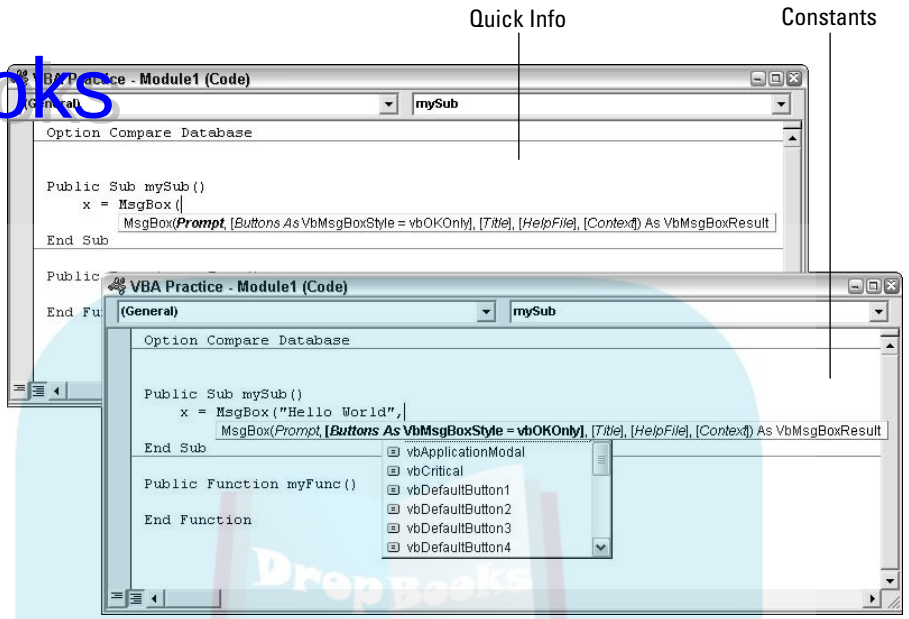

Figure 3-3: Quick Info (top) and list of Constants (bottom).

Okay, you gotta trust me on this one: The Quick Info and list of constants are actually there to help. Unfortunately, they are only of help to those people who've used the `MsgBox()` a zillion times in the past and need only brief reminders on syntax and available constants. For someone who's just learning, more in-depth information is needed. Fortunately, it's always easy to get.

Getting keyword help

Whether you're typing your own code or trying to modify someone else's, you can get information on any keyword at any time. Just select (double-click) the keyword right in the Code window where it's typed. Then press the Help key (F1) on your keyboard. The Help window that opens describes the command and its syntax.

After you type a keyword into a procedure, it's very easy to get more detailed help. Just select (double-click) the keyword, right where you typed it, and press the Help key (F1). This is also a great way to learn more about code other people have written because you can learn what each line of code does by double-clicking the first word in the line and pressing F1.

When you press F1, the Help page that opens describes whatever keyword you selected in your module. For example, if you double-click `MsgBox` in a procedure (to select it) and then press F1, the Help page for the `MsgBox` keyword opens, as in the example shown in Figure 3-4.

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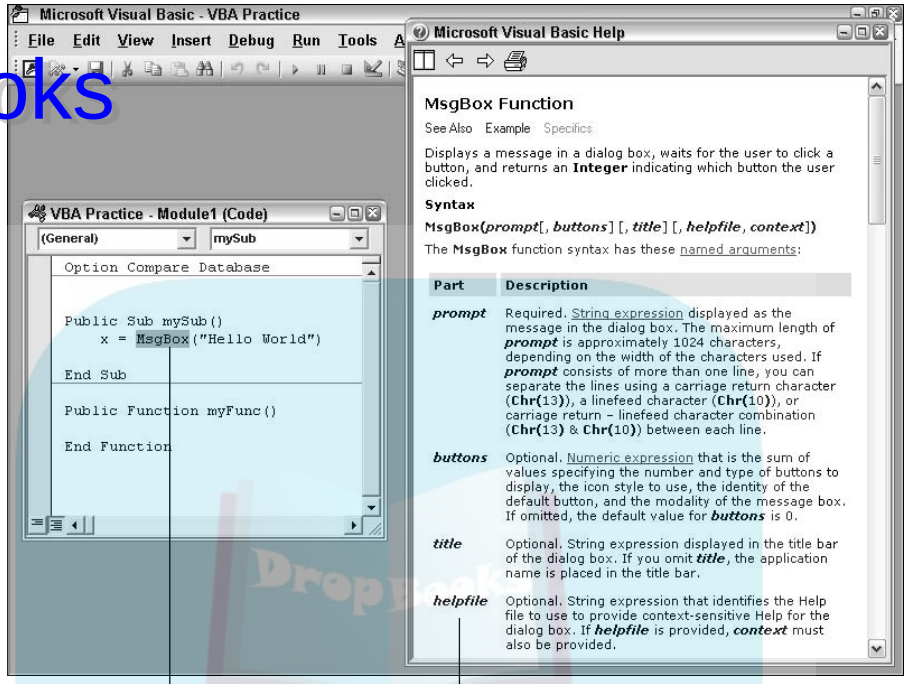

Figure 3-4: Help for the `MsgBox` keyword.

The Help window shows a ton of information about using the `MsgBox` keyword. The first paragraph describes what the keyword does. Under the heading, the syntax chart shows the same information that the Quick Info does (namely, the arguments that you can use with the keyboard) as well as the order in which you must use them. For example, the syntax chart for `MsgBox` looks like this:

```
MsgBox(prompt[, buttons] [, title] [, helpfile, context])
```

The first word, `MsgBox` in this example, is the keyword. The text and symbols enclosed in parentheses represent arguments that you can use with the `MsgBox` keyword. An *argument* is a piece of information that you give to the keyword to use for something. (More on that in the upcoming section, "Help with arguments.") The syntax chart uses square brackets, boldface, and italics as follows:

- **Bold:** Represents a required keyword.
- *Italic* or ***bold italic:*** Represents an argument.
- `[ ]`: Indicates that the argument is optional and can be omitted. Never type the square brackets into your code, or the code won't work.

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Beneath the syntax chart is a description of each argument that the keyword supports. For example, scrolling down a short way through this Help page reveals a description of each of the argument names that `MsgBox` supports, as in Figure 3-5.

The description of an argument tells you whether the argument is required or optional. If an argument is required, you must type an acceptable value for that argument into your code (always within the parentheses that follow the keyword). If an argument is optional, you can either type in an acceptable value for the argument or just not use the argument at all.

Either way, remember that you never type square brackets into your VBA code: The square brackets in the syntax chart are just there to indicate the optional arguments.

The argument acts as a placeholder for some actual value that you'll later pass to the procedure. If you have any experience at all using Access expressions, you're familiar with arguments. For example, in the expression `Sqr(81)`, `81` is the *value* being passed to the `Sqr()` (square root) function. When executed, the function returns `9` because 9 is the square root of 81.

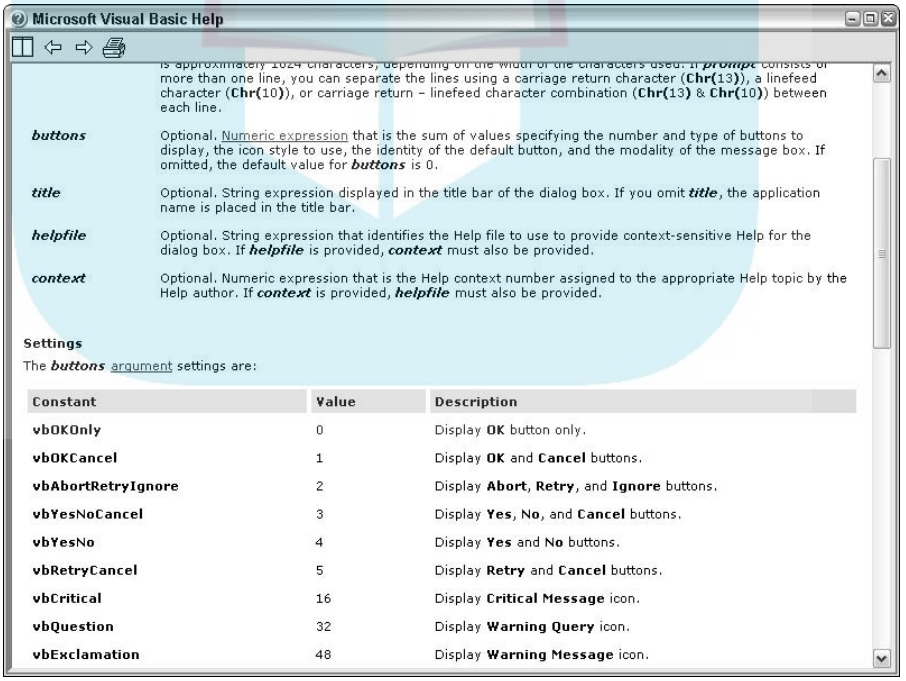

Figure 3-5: Find argument info in a keyword Help window.

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What constitutes an acceptable value for an argument is usually the second thing listed in the Help chart. Typically, it will be one of the following:

- **String expression:** This can be literal text enclosed in quotation marks, as in `"Hello World"`, or an expression that results in text.
- **Numeric expression:** This can be a number like `1` or `10`, or it can be an expression that results in a number.

That's a lot to try to understand. Take it one step at a time, though, with an example to try to make sense of it all. First, understand that the arguments of a keyword are always typed within parentheses, after the keyword. And multiple arguments are always separated by commas. So the most general view of any keyword that accepts three arguments would be as follows:

keyword (argument1, argument2, argument3)

In other words, you don't start typing the first argument until you've typed in the keyword and opening parenthesis. After you type the first argument, you have to type a comma before you start typing the second argument and so forth. The VBA editor won't know that you're ready to type the next argument until you type that comma. And finally, you have to type the closing parenthesis at the end of the statement. If you mess it up, you'll get a compile error as soon as you press the Enter key. All you can do is click OK and try again. (Or delete the whole line.)

Getting back to the `MsgBox()` keyword and its arguments, you can see at the top of the first Help page (refer to Figure 3-4) that `MsgBox()` is actually a function that returns a value. Although it's not specifically stated in the syntax, it means that to use the command properly in a procedure, you need to use this syntax:

```
x = Msgbox(prompt[, buttons ][, title][,helpfile, context])
```

You can see in the Help page that the *prompt* argument is required and must be a string expression. So if you want the message box to display `Hello World`, you would type those words (remembering to enclose them in quotation marks) as the first argument, as in the following example. Because the remaining arguments are optional, you could omit them and just end the whole line with a closing parenthesis, as follows:

```
x = MsgBox("Hello World")
```

The Immediate window that I discuss in Chapter 2 provides a handy means of testing a VBA statement on-the-fly to see whether it will work when actually executed in your code. For example, if you type (exactly) **x=MsgBox("Hello World")** into the Immediate window and press Enter, VBA will execute the statement. The result is a message box containing the words `Hello World`, as in Figure 3-6. (You have to click the OK button in the message box to get back to working in the Visual Basic editor.)

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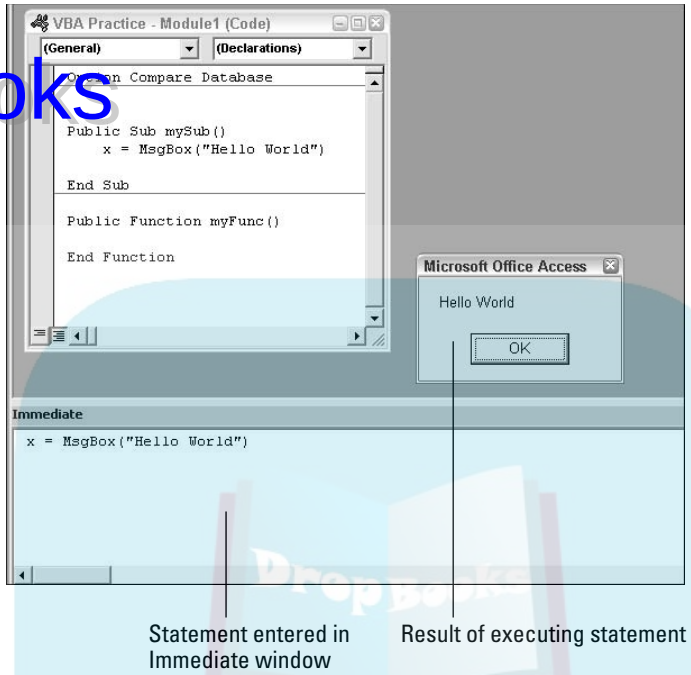

Figure 3-6: Test VBA statements in the Immediate window.

Help with arguments

Refer to Figure 3-5 (of the Help page for the `MsgBox` keyword) to see the Settings section (below the argument descriptions) that provides some specific info on using the *`buttons`* argument. You can use either the constant or the value in the command. For example, if you want the `MsgBox` statement to show both an OK and a Cancel button (rather than just an OK button), you would use either the value `1` or the constant `vbOKCancel` as the second argument in the `MsgBox` statement. Arguments are always separated by commas, so the correct syntax would be either

```
x = MsgBox("Hello World",1)
```

or

```
x = MsgBox("Hello World",vbOKCancel)
```

A *constant* is a special word in VBA that's been assigned some value that never changes. For example, the constant `vbOKOnly` is always the same as the value `0`. You can use `vbOKCancel` (which is easier to remember) in place of `0` in a `MsgBox` statement.

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As instructed in the Help page, you can combine values (by using a + sign) in the *buttons* argument to use multiple options. For example, the vbYesNo setting (value = 4) displays Yes and No buttons in the message box. The vbQuestion setting (value = 32) setting displays a question mark icon in the message box. Thus, if you want to display a message box that displays the question Are you there?, a question mark icon, and Yes and No buttons, you could type any of the following statements. (The 36 is allowed because the sum of the two settings' values, 4 and 32, equals 36.)

```
x = MsgBox("Are you there?",vbQuestion+vbYesNo)
```

```
x = MsgBox("Are you there?",32+4)
```

```
x = MsgBox("Are you there?",36)
```

You can test out any of those VBA statements by typing it into the Immediate window and pressing Enter. Because all three statements product the same result, you'll see a message box with the prompt Are you there?, a question mark icon, and Yes and No buttons, as in Figure 3-7.

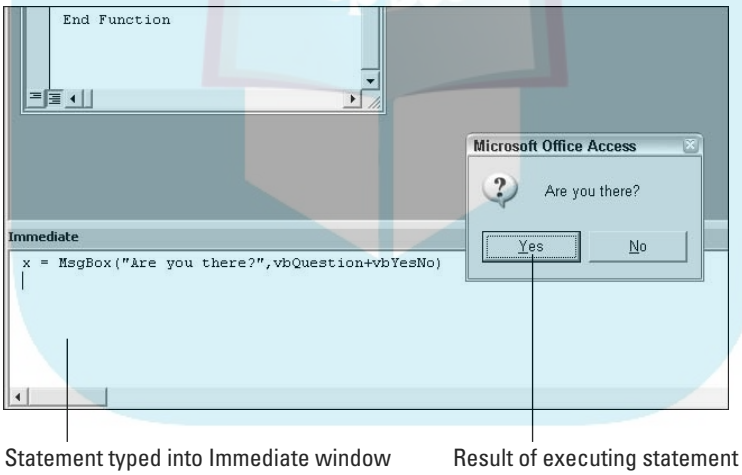

Figure 3-7: Test a MsgBox statement in the Immediate window.

The third optional argument in the MsgBox keyword, *title*, allows you to specify a title to display in the dialog box. If you omit that argument in Access, the default title for all Access message boxes — Microsoft Office Access — appears in the message box. If you include a title (as text in quotation marks), that title replaces the default title. For example, if you test this command

```
x = MsgBox("Are you there?",vbQuestion+vbYesNo,"Howdy")
```

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in the Immediate window, the message box opens with the word `Howdy`, rather than `Microsoft Office Access`, in its title bar.

The order of arguments in a VBA statement is critical. For example, the title for a `MsgBox` must be the third argument in the statement. If you want to use a *`title`* argument but not a *`buttons`* argument, you'd have to still include a placeholder comma for the *`buttons`* argument and a similar comma for the *`title`* argument, as in the following example:

```
x = MsgBox("Hello World", ,"Howdy")
```

In this statement, the first argument (*`prompt`*) is `"Hello World"`, and the second argument — which acts as a placeholder for the *`buttons`* argument — is empty. Because you've omitted the argument, Access will use the default value for that argument, which is `vbOKOnly` (`0`). Thus, when the statement executes, the message box will appear with the default OK button only. The third argument is `"Howdy"`, which will appear in the message box title bar.

About named arguments

Named arguments provide an alternative to putting arguments in a specific argument. With named arguments, you can just type the argument name followed by a colon and an equal sign (`:=`) and the value you want for that argument. For example, the following statement is equivalent to `x = MsgBox("Hello World", ,"Howdy")`, but it uses argument names rather than commas to specify which argument is receiving which value.

```
x=MsgBox(prompt:="Hello World", title:="Howdy")
```

Unfortunately, it's not always easy to tell whether a statement supports named arguments. The Quick Info doesn't provide any clues, and the Help doesn't often show the syntax with the optional names in place. About the only clue you get as to whether a statement supports named arguments is from the sentence above the argument descriptions in Help. For example, refer to the Help for the `MsgBox` function in Figure 3-4: namely, the sentence `The MsgBox function syntax has these names arguments`, just below the syntax chart for `MsgBox()`. But because named arguments are entirely optional, you don't have to worry about accidentally excluding them when writing your own code.

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Modifying Existing Code

Just knowing how to read the Help screens is a challenge in itself. It just takes time to practice. Programming isn't the kind of skill you learn overnight. It's a skill you acquire gradually by learning about one keyword, then another, then another, and so forth. There are so many keywords that it would take years to learn them all.

Fortunately, you don't have to learn every keyword before you start writing code. Most programmers actually learn to program by example. That is, they see other peoples' code, perhaps even use that same code themselves, or modify that code to suit their own needs.

Using other peoples' code, when possible, certainly offers some advantages because at least some of the work is done for you. Switch gears for a moment and look at ways in which you can get prewritten code into a module in your own database.

Copy-and-paste code from the Web

Many programmers start their careers not so much by writing code from scratch but rather by using code that others have written and adapting it to their own needs. When that code is displayed onscreen, as in a Web page, the first step is to copy and paste the code into a module, where you select what you want to copy, copy it (press Ctrl+C), click in your module, and paste (press Ctrl+V).

Suppose you're browsing the Web, and you come across a sample procedure in a Web page. You don't want to retype the whole procedure into your own module, so you need to copy it. First, you need to select the whole procedure (and nothing but the procedure) by dragging the mouse pointer through the whole procedure — from the starting `Sub` or `Function` statement to the ending `End Sub` or `End Function` statement. After you select the code, press Ctrl+C or right-click anywhere in the selected text and choose Copy, as in Figure 3-8.

After you select and copy the code, just click anywhere in a standard module and then choose Paste. The exact code you selected will appear in your module.

You can find most of the code examples from this book at `www.coolnerds.com/vba`. You can copy and paste any code from that site into any module in your own database.

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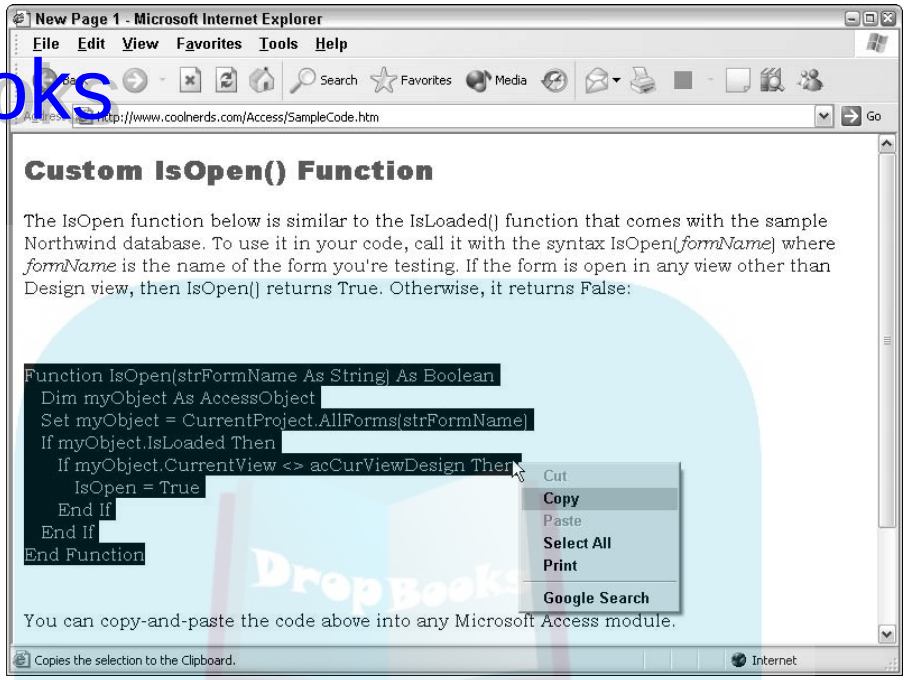

Figure 3-8: Use sample VBA code from a Web page.

Importing standard modules

The copy-and-paste method works best with code that's displayed on your screen like plain text, but it's not the only way to get code into your database. You can also import standard modules from other databases.

For example, suppose you have a database named `myAccessDB.mdb`, and within that database is a module named myModule. At the moment, though, you have some other database open, and you want to copy myModule from `myAccessDB.mdb` into the current database. In that case, you use the Import option on the Access File menu:

1. **If you're in the VB editor, press Alt+F11 to return to the Access program window.**
2. **Choose File➪Get External Data➪Import (from the Access menu bar).**
3. **In the Import dialog box that opens, navigate to the folder that contains the database from which you want to import code (myAccessDB in this case).**
4. **When you find the icon for the database that contains the code you want to import, double-click that icon.**

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5. **In the Import Objects dialog box that opens, click the Modules tab.**
6. **Click the name of the module you want to import; then click OK.**

   When you click Modules in the database window of your current database, you'll see the imported module's name in the main pane. Double-click the module's name, as usual, to open that module in the VBA editor.

Modifying existing code

Modifying existing code isn't all that different from writing new code because you still have to know the exact meaning and syntax of every keyword used in the code. In some cases, the procedure might work as-is in your database. In other cases, you might have to modify the code to get it to work.

If you need to modify the code, you can't do so unless you understand what the code is doing and how it works. Thus, you have to know the purposes of each statement. If you need to modify a statement, you need to know the correct syntax. Like when writing code, you can get more information about existing code by using either of these methods:

- To see the Quick Info for a line of code, right-click the line and choose Quick Info.
- For detailed help with a keyword, select (double-click) that keyword and press Help (F1).

Modifying existing code takes almost as much skill and knowledge as writing your own code, so don't expect to be able to get anything accomplished by taking wild guesses. You can see examples of modifying existing code throughout this book. For now, just be aware that you can copy and paste VBA code into a module. Or, if the code is already in some other database's module, you can import that module into your current database.

In Chapter 4, you can pick up more advanced skills for creating procedures. For now, be aware that every VBA keyword has certain rules of syntax, which you must follow to a T if you expect your code to work. You can't expect to learn and memorize every keyword and its syntax in a short time because there are just too darn many keywords. However, after you know how to get help with keywords, you'll always have the information that you need at your fingertips.

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Part II

VBA Tools and Techniques

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In this part . . .

The only reason why you'd ever bother with VBA is to make Access do stuff that it can't do otherwise. Either that or to make Access do something you'd otherwise have to do yourself, over and over again. You coax Access into doing stuff by writing VBA code that manipulates the objects in your database automatically and behind the scenes. That's the short description of how it all works, anyway. More detailed explanations and examples are in the three chapters herein.

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Chapter 4

Understanding Your VBA Building Blocks

In This Chapter

- Commenting your code
- Storing data in variables and constants
- Repeating chunks of code with loops
- Making decisions with `If...End If` statements

Many programmers begin their careers not so much by writing code from scratch. Rather, they acquire bits of code from books, Web sites, and other resources because that's easier than trying to figure it out from scratch. Plenty of sample code is made available through books and Web sites. Don't worry about "stealing" the code: If folks didn't want you copying their code, they wouldn't have made it accessible to you in the first place!

Whether you plan to write your own code or tweak other peoples' code, you need to understand some fundamental programming concepts for any of the code to make sense.

You can think of the various programming concepts described in this chapter as the basic building blocks from which all programs are created. As you learn more about Visual Basic for Applications (VBA), you'll see the same building blocks used to perform many different tasks, in many different settings. The first step, though, is to just be aware that such things exist so that you'll recognize them when you see them.

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The variables, constants, arrays, loops, and decision-making techniques that I present in this chapter are the basic building blocks from which all programs are written. Writing VBA code in Access requires both a basic knowledge of those programming techniques plus the ability to work with Access objects (which I cover in Chapter 5).

Commenting Your Code

When you look at existing code, notice that some lines look like plain English while others look like VBA code. The lines that look like English are programmer *comments.* Only humans see comments; the computer sees only the VBA code. Thus, using comments is entirely optional to you, as a programmer.

Programmers add comments to their code for two reasons:

- **To help others who are trying to understand how the code works.**
- **To jot down notes to yourself as you go — to remind yourself of the purpose of different parts of your code.**

  When typing your own code, you're welcome to type in your own comments. They don't have to be written for other programmers.

The first character of a comment must be an apostrophe ('). The comment ends where you press Enter to end the line. After you type the apostrophe, you can type any text you want on that same line because VBA won't treat it as code. When viewing existing code, you'll see the apostrophe at the start of each comment within the code, as in the example shown in Figure 4-1. (In the Code window, comments are also colored green.)

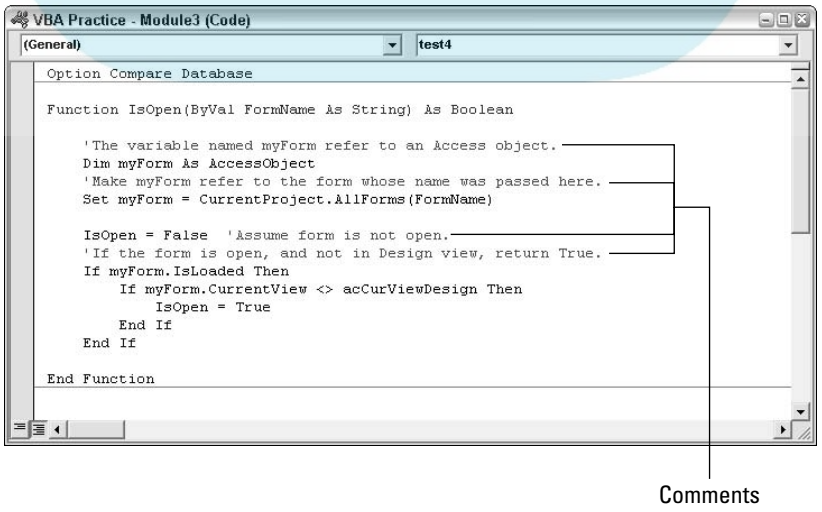

Figure 4-1: Add comments to make your code clear.

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When you're modifying existing code, remember that the comments are for human consumption only. Changing a comment won't fix code or change how it works at all. Comments are only notes jotted down within VBA code.

As I mention, writing comments is easy because after you type the initial apostrophe, you can type anything you want. Writing code, though, is a lot harder because of the rules of *syntax* (word order and punctuation). Plus, there are lots of rules concerning the data on which VBA can operate. Like when learning to create tables in Access, one of the first things that you need to understand is that like tables in Access, VBA has data types.

Understanding VBA Data Types

When you create a table in Access, you need to define the data type of every field in the table. Data types in tables include things like Text (for storing short strings of text), Memo (larger chunks of text), Number (for numbers), Date/Time (for dates and times), and so forth.

VBA can work with data stored in tables. But just like tables, VBA often needs to know the type of information it's working with. As you'll see shortly, there are a couple of places in VBA code where you can define data types. You need to know what the various data types mean.

Table 4-1 lists the data types that you'll work with in VBA. The data type names are listed in the left column, each followed by a brief description. The Storage Size column shows how many bytes each data type consumes. The Declaration Character column shows an optional character that can be used at the end of a name to specify a data type. That's really more information than you need right now. Just knowing the names of the various data types is sufficient for now.

Table 4-1 VBA Data Types

Data Type	*Acceptable Values*	*Storage Size*	*Declaration Character*
`Boolean`	`True` (–1) or `False` (0)	2 bytes	
`Byte`	0 to 255	1 byte	
`Currency`	–922,337,203,685,477.5808 to 922,337,203,685,477.5807	8 bytes	`@`
`Date`	January 1, 100 to December 31, 9999	8 bytes	

(continued)

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Table 4-1 ***(continued)***

Data Type	*Acceptable Values*	*Storage Size*	*Declaration Character*
`Double`	–1.79769313486231E308 to –4.94065645841247E-324 for negative values; 4.94065645841247E-324 to 1.79769313486232E308 for positive values	8 bytes	#
`Integer`	–32,768 to 32,767	2 bytes	%
`Long`	–2,147,483,648 to 2,147,483,647	4 bytes	&
`Object`	Name of any object	4 bytes	
`Single`	–3.402823E38 to –1.401298E-45 for negative values; 1.401298E-45 to 3.402823E38 for positive values	4 bytes	!
`String`	Any text from 0 to about 2,000,000,000 characters in length	10 + string length	$
`Variant` (no text)	Any number up to the range of the `Double` data type	16 bytes	
`Variant` (with text)	Any text up to 2,000,000,000 characters in length	22 + string length	

Boring technical stuff on the Decimal data type

When perusing the VBA Help and drop-down menus, you might come across the `Decimal` data type. I omitted the `Decimal` data type from Table 4-1 because it just flat-out doesn't work. If I had included the `Decimal` data type in the table, its acceptable range would be +/–79,228,162,514,264,337,593,543,950,335 with no decimal point; +/–7.9228162514264337593543950335 with 28 places to the right of the decimal; smallest non-zero number +/–0.0000000000000000000000000001. The `Decimal` data type's storage size would be 14 bytes, and it would have no type declaration character.

The obscure `Decimal` data type does exist, but you can't declare an item as being of that data type. Instead, you have to declare the item as a `Variant` data type with a subtype of `Decimal`. For example, `Dim X as Variant` defines a variable `X` as a variant; `X = CDec(`*`value`*`)` stores *`value`* in `X` as a `Decimal` data type.

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In VBA code, you'll often use data types just to store little bits of information for short periods of time. The reasons for storing data with VBA code vary. One of the first places you're likely to encounter data types in VBA is when you want to pass data to, or from, your custom procedure.

Passing Data to Procedures

You write a procedure to perform a series of steps. The exact object on which the procedure performs its task can vary. For example, suppose you inherit a database table of names and addresses, with everything typed in uppercase letters, as in JOHN SMITH. You want to convert all that text to proper case (John Smith), but you don't want to retype it all.

You could write a procedure to do the conversion for you, but you wouldn't want the procedure to fix just one name or one address. You want the procedure to be flexible enough to fix all the names and addresses in the table with the click of a button. In other words, you want Access to hand over some piece of information, like JOHN SMITH, and then have the procedure return back John Smith. However, you want it to do that with any text you pass to it, including JANE DOE and P.O. BOX 123 and HANK R. MCDOUGAL.

If you want a procedure to accept information from the outside world (so to speak), you have to tell the procedure what type of data to expect and where to put the data. You do so within the parentheses that follow a procedure's name within a module. What you type is the *argument list* (or `arglist`, for short). The syntax for each argument is

```
name As type
```

where `name` is any name of your choosing, and `type` is one of the data type names listed in Table 4-1. For example, if you want to create a `Sub` procedure named `showMsgBox()` and pass one parameter named `msgText` to it as text, the first line of the procedure needs to contain `msgText As String` as an argument, as in the following example:

```
Sub showMsg(msgText As String)

End Sub
```

The above lines define a `Sub` procedure named `showMsg()` that accepts one argument: a string (text) named `msgText`. The `msgText` name I just made up myself: I could have used any name I wanted. The `As String` tells the rest of the procedure to expect text to be passed.

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You can pass multiple bits of information to a procedure as long as each has a unique name, and you give each a data type. Separate each name and type with a comma. For example, the `mySub()` first line in Figure 4-2 defines a procedure named `showMsg()` that accepts three arguments: `msgText`, `bttns`, and `msgTitle` (all names I made up off the top of my head). As you can see, `msgText` and `msgTitle` are both declared as the `String` data type, and `bttns` is declared as the `Integer` data type.

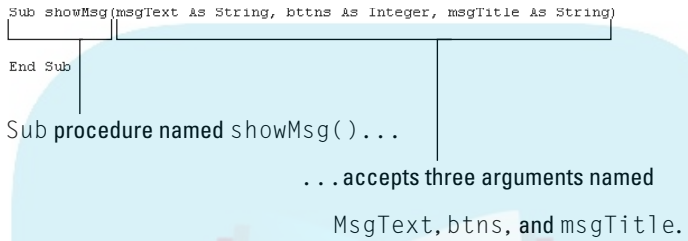

Figure 4-2: A Sub procedure can accept different arguments.

Although a `Sub` procedure can accept incoming data through its arguments, it can't return any data to Access or other VBA procedures. A `Function` procedure, on the other hand, can both accept incoming data and return a value. Thus, a `Function` procedure is like any function that's built into Access. For example, the built-in `Date()` function always returns the current date.

To see for yourself that `Date()` always returns the current date, type `? Date()` into the Immediate window and press Enter. You'll see today's date.

When you want your own custom procedure to return a value, you have to define the data type of the value being returned. The name of the return value is always the same as the function name, so you don't include a name. And because you're defining a return value, you place the declaration outside the closing parenthesis, as follows:

```
Function name(arglist) As type

End Function
```

where *`name`* is the name of the function, *`arglist`* defines any incoming arguments (exactly as it does in a `Sub` procedure), and *`type`* is the data type of the value that the function returns. The *`type`* placeholder must match one of the data type names listed in Table 4-1.

Figure 4-3 shows an example where the first line defines a `Function` procedure named `isOpen()` that accepts a string as an argument and then returns a `True` or `False` value. (***Note:*** Those are only the first and last lines. The programmer would have to add more code between them for the procedure to actually do anything.)

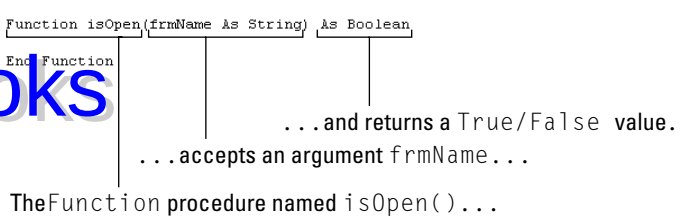

Figure 4-3: Functions accept arguments and return values.

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From the standpoint of modifying existing code, the argument list inside the parentheses tells you what data is passed to the procedure and as what data type. Code within the procedure can then work on the data that was passed, simply by referring to it by name. Within a procedure, you use variables to store and manipulate little chunks of data, like the values passed to a procedure. Variables are a big part of all programming languages, so spend some time getting to know them.

Storing data in variables and constants

All programming languages, including VBA, have a means of storing little chunks of information (data) in temporary little cubbyholes called *variables*. Obviously, the contents of the cubbyhole can vary. For example, a variable named `LastName` might contain Smith, Jones, McDougal, or whatever. The VBA code can operate on whatever value happens to be in the variable at the moment.

Creating a variable is a two-step process:

1. **Declare the variable's name and data type with a `Dim` statement.**
2. **Assign a value to the variable as needed.**

The syntax usually involves two lines of code that follow this structure:

```
Dim name As type
name = value
```

where *`name`* is a name of your own choosing, *`type`* is one of the data types listed in Table 4-1, and *`value`* is the data that you want to store in the variable. When naming a variable, stick to using short names with no spaces or punctuation. Also make sure the name starts with a letter. You can use either letters or numbers as part of the name after the first character.

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Here's an example of creating an `Integer` variable named `x` and storing the number `10` in that variable:

```
Dim x As Integer
x = 10
```

Here's an example of creating a string variable name `LastName` and putting the name `Jones` in it:

```
Dim LastName As String
LastName = "Jones"
```

Note the use of the quotation marks around `Jones`. Like in Access expressions, the quotation marks signify a literal text: That is, after the statement `LastName = Jones` executes, the variable `LastName` will contain (literally) the name `Jones`.

A *constant* is similar to a variable in that it's a name that refers to some value. However, after you assign a value to a variable, you can't change it. Hence, the value remains constant.

Lots of constants are built into VBA, as you'll see in many examples throughout this book. If you ever want to create your own constant, the syntax is the following:

```
Const name As type = value
```

where, once again, *`name`* is a name of your choosing, *`type`* is a data type from Table 4-1, and *`value`* is the data you want to store in the constant. For example, the following VBA statement creates a constant named `pi` that stores the number `3.14159265` as a double-precision number.

```
Const pi As Double = 3.14159265
```

Storing data in arrays

If you think of a variable or constant as one little cubbyhole in which you can tuck away information, a collection of cubbyholes is an *array.* Each cubbyhole is an *element* of the array, although each is actually just a variable in which you can store information. The cubbyholes in an array, however, all have the same name. You use a *subscript* in parentheses, which defines an elements position in the array, to refer to a specific item in the array.

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Declaring an array is a lot like declaring a single variable, but you have to tell VBA how many items are in the array. The syntax looks like this:

```
Dim name(dimensions) As type
```

where *name* is a name that you give the array, *dimensions* specifies how many items are in the array, and *type* is one of the data types listed in Table 4-1. For example, the following VBA statement creates an array named `shipOptions` that contains five *elements* (each element being one cubbyhole of information):

```
Dim shipOptions(5) As String
```

After VBA executes the above statement, five little cubbyholes, each capable of storing any text (string), are available. The first array element is named `shipOptions(1)` (pronounced *shipOptions sub one*). The second element is named `shipOptions(2)` (pronounced *shipOptions sub two*), and so forth, as follows:

```
shipOptions(1)
shipOptions(2)
shipOptions(3)
shipOptions(4)
shipOptions(5)
```

Because each of those array elements is actually a string variable, you could assign a value to each by using the same syntax that you use to assign values to individual variables, as follows:

```
shipOptions(1) = "USPS Media"
shipOptions(2) = "USPS Priority"
shipOptions(3) = "UPS Ground"
shipOptions(4) = "UPS Second Day"
shipOptions(5) = "UPS Overnight"
```

The `shipOptions` array is a *one-dimensional array* in that it only has one dimension: length. Each item in the array contains exactly one subscript indicating the item's position in the one-dimensional list of items. You can also declare multidimensional arrays. For example, a two-dimensional array has two dimensions — length and width — like a table:

The following VBA statement declares a two-dimensional array named `miniTable` that contains three rows and two columns:

```
Dim miniTable(3,2) As String
```

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Each element in the two-dimensional name has two subscripts. The first subscript represents the row position of the element. The second subscript represents the column position of the element. Hence, you can envision the variable names (pubbyholes) creates by that VBA statement as follows:

```
miniTable(1,1)          miniTable(1,2)
miniTable(2,1)          miniTable(2,2)
miniTable(3,1)          miniTable(3,2)
```

In Access, where you already have tables to store all your data in rows and columns, there's rarely any need to use multidimensional arrays. However, from the standpoint of modifying existing code, when you see a `Dim` statement that declares some name followed by a number in parentheses, as in

```
Dim x(10) As String
```

you need to be aware that the statement is actually creating ten separate variables names: `x(1)`, `x(2)`, `x(3)`, and so forth up to `x(10)`.

Module-level versus procedure-level

Unlike data stored in Access tables, data stored in VBA variables (including arrays and constants) doesn't last too long. Each variable has a *lifetime* that defines how long it exists. Closely aligned with a variable's lifetime is its *scope,* which defines which objects in the database can and cannot access the variable. The scope and lifetime of a variable depend on where you define the variable within a module.

The top of a module, where you typically see `Option Compare Database`, is the *declarations area.* Here you can *declare* (sort of like announcing) settings, variables, constants, and arrays to all procedures in the module.

For example, the line `Option Compare Database` is a *module-level* declaration that announces to all procedures in the module that this code is running within the context of a database. When comparing values in code using logic like *equals* or *greater than,* the code should use the same rules as the rest of the database.

You can also declare and assign values to variables, arrays, and constants in the declarations area of the module. Those variables have module-level scope and lifetime. Thus, the variables are *public* in the sense that they are visible to all procedures and exist as long as any procedure in the module is running.

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Variables, constants, and arrays declared inside a procedure have *procedure-level* lifetime and scope. Thus, they are *private* to the procedure. Each variable defined within a procedure is visible to only that procedure and exists only while that procedure is running.

The significance of module-level versus procedure-level becomes more apparent as you gain experience. For now, the main thing to keep in mind is that module-levels variables, constants, and arrays are declared at the top of a module, before the first procedure. Something that is *procedure-level* refers to variables, constants, and arrays defined within a procedure. Figure 4-4 illustrates the difference.

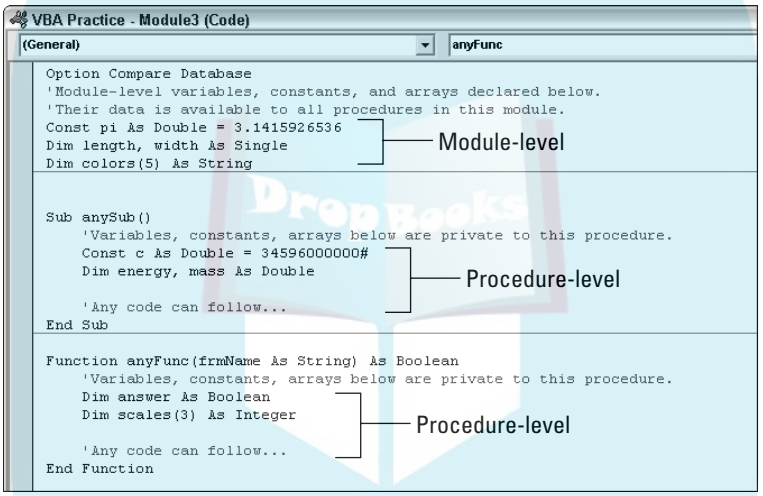

Figure 4-4: Module-level and procedure-level declarations.

Naming conventions for variables

Some programmers use naming conventions to identify the data type of a variable as part of the variable or constant's name. The naming conventions are entirely optional; you don't have to use them. A lot of VBA programmers follow them, though, so you're likely to see them in any code you happen to come across.

The idea behind a naming convention is simple: When you define a new variable, make the first three letters of the name (the *tag*) stand for the type of variable or object. For example, the following line creates an `Integer` variable named `intMyVar`, where `int` is short for *integer*.

```
Dim intMyVar as Integer
```

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The tag added to the front of the name (`int`) doesn't affect how the variable is stored nor how you can use it. The tag serves only as a reminder that `MyVar` is an `Integer`. Table 4-2 summarizes the tags that you'll most likely encounter when reading other people's code. In the Sample Declaration column of the table, the *Name* means that you can put in any variable name of your own choosing.

Table 4-2 Naming Conventions Used among VBA Programmers

Tag	*Stands For*	*Sample Declaration*
Byt	Byte data type	Dim byt*Name* As Byte
Cur	Currency data type	Dim cur*Name* As Currency
Dtm	Date/Time data type	Dim dtm*Name* As Date
Dbl	Double data type	Dim dbl*Name* As Double
Int	Integer data type	Dim int*Name* As Integer
Lng	Long integer data type	Dim ing*Name* As Long
Sng	Single data type	Dim sng*Name* As Single
Bln	Boolean data type	Dim bln*Name* As Boolean
str	String data type	Dim str*Name* As String
var	Variant data type	Dim var*Name* As Variant

Repeating Chunks of Code with Loops

Occasionally a situation occurs in which you want to execute one or more VBA statements multiple times. Suppose you write some VBA statements that need to operate on each record in a table, and the table holds 1,000 records. You have two choices: Write each set of statements 1,000 times or create a loop that repeats the one set of statements 1,000 times. Needless to say, typing the statements once rather than 1,000 times saves you a lot of time. A *loop* is your best bet.

Using Do...Loop to create a loop

The `Do...Loop` block is one method of setting up a loop in code to execute statements repeatedly. The loop requires two lines of code: one at the top and one at the bottom. You have a lot of flexibility when defining a `Do...Loop`.

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In fact, there are two syntaxes for creating these loops. The first is the following:

```
Do [{While | Until} condition]
   [statements]
   [Exit Do]
   [statements]
Loop
```

The second syntax provides the option of defining the condition at the bottom of the loop, using this syntax.

```
Do
   [statements]
   [Exit Do]
   [statements]
Loop [{While | Until} condition]
```

In both syntaxes, *statements* refers to any number of VBA statements, and *condition* is an expression that can result in either `True` or `False`. The vertical bar (also called a *pipe*) indicates that you can use one word or the other. For example, you can use the word `While` or the word `Until`, but you can't use both. Other types of loops use similar constructs. So rather than dwell on this type of loop right now, look at some other ways to set up loops.

For now, just realize that when you look at existing code, any statements between the `Do` and `Loop` statements will be executed repeatedly. Statements outside the loop will still be executed once each, top to bottom. Only the statements inside the loop will be executed repeatedly, as illustrated in Figure 4-5.

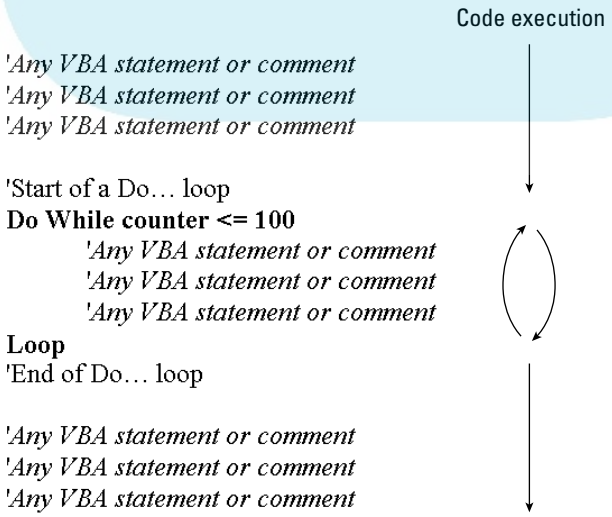

Figure 4-5: Statements inside a loop are executed repeatedly.

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Using While...Wend to create a loop

The `While...Wend` loop is similar to `Do...Loop`, but it uses the simpler (and less flexible) syntax shown in the following code:

```
While condition
   [statements]
Wend
```

where *condition* is an expression that results in a `True` or `False` value, and *statements* are any number of VBA statements, all of which execute with each pass through the loop.

The condition is evaluated at the top of the loop. If the condition proves `True`, all lines within the loop execute (down to the `Wend` statement), and then the condition at the top of the loop is evaluated again. If the condition proves `False`, all statements within the loop are ignored, and processing continues at the first line after the `Wend` statement.

Statements within a `While...Wend` loop execute repeatedly, just as they do with a `Do...Loop`, as illustrated in Figure 4-6.

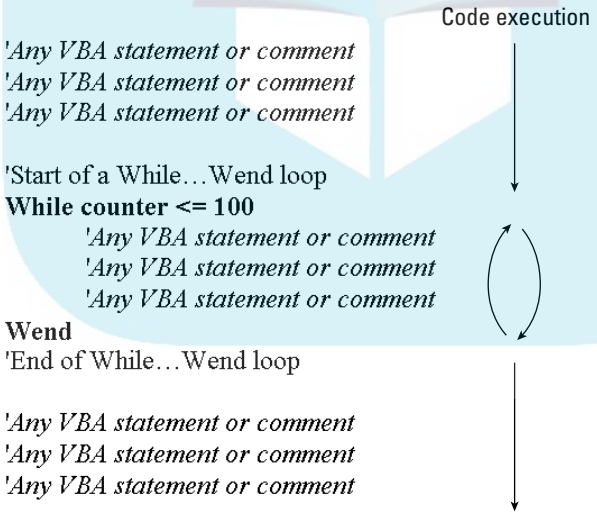

Figure 4-6: Statements inside this loop execute repeatedly.

Using For...Next to create a loop

Yet a third pair of commands for creating loops in code is the `For...Next` block of statements. The syntax for a `For...Next` loop is as follows:

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```
For counter = start To end [Step step]
   [statements]
   [Exit For]
   [statements]
Next [counter]
```

where

- *counter* is any name that you want to give to the variable that keeps track of passes through the loop.
- *start* is a number that indicates where the loop should start counting.
- *end* is a number that indicates when the loop should end.
- *step* is optional and indicates how much to increment or decrement *counter* with each pass through the loop. If omitted, *counter* increments by 1 with each pass through the loop.
- *statements* are any number of VBA statements that execute with each pass through the loop.

You can see many `For...Next` examples throughout this book. For now, when you're looking at existing code and see a `For...Next` pair of statements, realize that the statements inside that loop will be executed repeatedly, as illustrated in Figure 4-7.

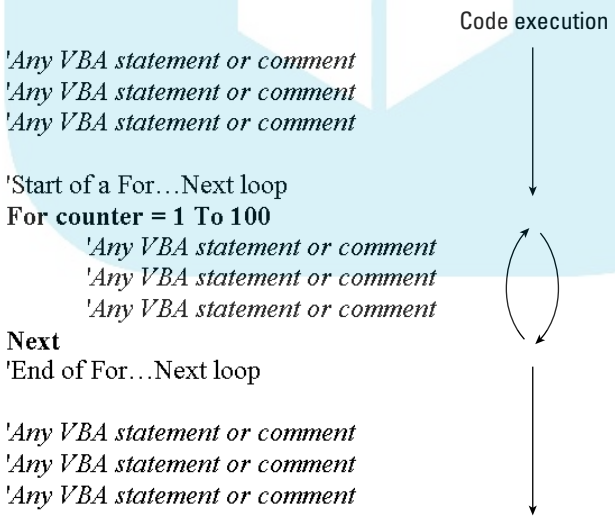

Figure 4-7: Statements inside this loop are executed repeatedly.

Making Decisions in VBA Code

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Decision making is a big part of programming because most programs need to be smart enough to figure out what to do, depending on the circumstances. Often, you want your code to do one thing if such-and-such is true but do something else if such-and-such is false. You use *conditional expressions* to determine whether something is true or false. A conditional expression is one that generally follows this syntax:

```
Value ComparisonOperator Value
```

where `Value` is some chunk of information, and the `ComparisonOperator` is one of those listed in Table 4-3.

Table 4-3 Comparison Operators

Operator	*Meaning*
=	Equal to
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
<>	Not equal to

For example, the expression

```
[Last Name] = "Smith"
```

compares the contents of the `Last Name` field with the string `"Smith"`. If the `[Last Name]` field does indeed contain the name *Smith,* the expression is *(returns)* `True`. If the `[Last Name]` field contains anything other than *Smith,* the expression returns `False`.

Another example is the following statement:

```
[Qty] >= 10
```

The contents of the `Qty` field are compared with the number 10. If the number stored in the `Qty` field is 10 or greater, the expression returns `True`. If the number stored in the `Qty` field is less than 10, the expression returns `False`.

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You can combine multiple conditional expressions into one by using the logical operators summarized in Table 4-4.

Table 4-4 Logical Operators

Operator	*Meaning*
AND	Both are true.
OR	One or both are true.
NOT	Is not true.
XOR	Exclusive or: One — not both — is true.

The following conditional expression requires that the [Last Name] field contain *Smith* and the [First Name] field contain *Janet* in order for the entire expression to be True:

```
[Last Name]="Smith" and [First Name]="Janet"
```

You can include spaces on either side of the equal sign or not. Either way works.

The following example is an expression that returns True if the State field contains either *NJ* or *NY*:

```
[State]="NJ" or [State]="NY"
```

Using If...End If statements

You have a couple of ways to write VBA code that's capable of making a decision. The simplest — and by far most common — is the If...End If block of code, which uses this syntax:

```
If condition Then
   [statements]...
[Else]
   [statements]...
End If
```

where *condition* is an expression that results in True or False, and *statements* refers to any number of valid VBA statements. If the condition proves True, the statements between Then and Else execute, and all other statements are ignored. If the condition proves False, only the statements after the Else statement execute, as illustrated in Figure 4-8.

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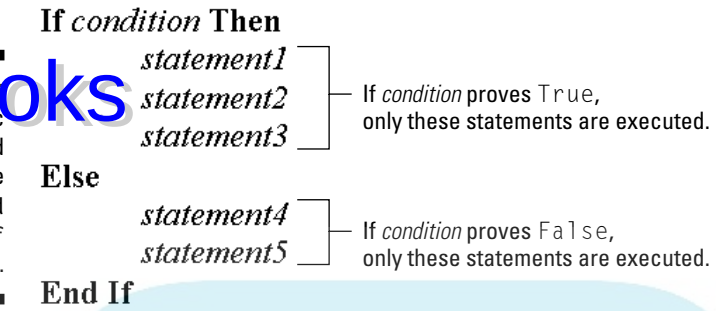

Figure 4-8: The basic idea behind the If...End If statement.

You have a little bit of flexibility when using `If...End If`. If only one line of code executes for a `True` result and only one line executes for a `False` result, you can put the whole statement on a single line and omit the `End If` statement, as the following shows:

```
If State="NY" Then TaxRate=0.075 Else TaxRate=0
```

Using a Select Case block

In some situations, you might need to have your code make a decision based on several possibilities. For example, perhaps you need to perform different statements depending on which of ten product types a person ordered. In that case, you can set up a `Select Case` block of code, which performs a particular set of instructions depending on some value. Typically, the value is stored in a variable or field in a table and is also a number that represents some previously made selection.

The basic syntax of a `Select Case` block of code looks like this:

```
Select Case value
   [Case possibleValue [To possibleValue]
      [statements]]
   [Case possibleValue [To possibleValue]
      [statements]]...
   [Case Else
      [statements]]
End Select
```

where *`value`* is some value (like a number), and *`possibleValue`* is any value that could match the *`value`*. You can have any number of `Case` *`possibleValue`* statements between the `Select Case` and `End Select` statements. Optionally, you can include a `Case Else` statement, which specifies statements that execute only if none of the preceding `Case` *`possibleValue`* statements prove `True`.

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Each `Case` statement can have any number of statements beneath it. When the code executes, only those statements after the `Case` statement that matches the *`value`* at the top of the block execute. Figure 4-9 shows the general concept.

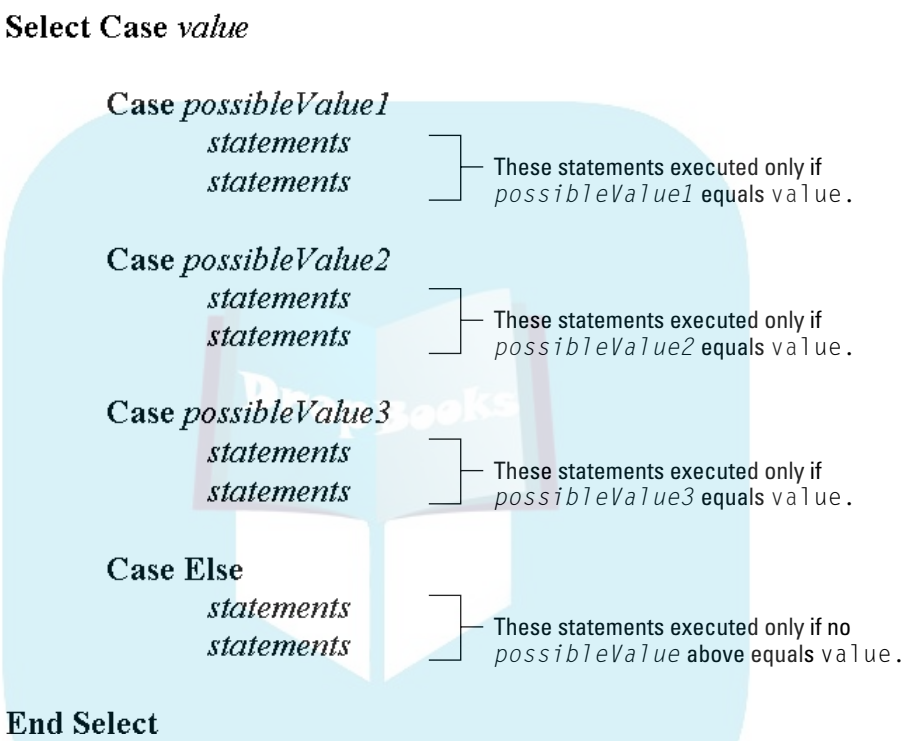

Figure 4-9: A `Select Case` block runs only certain lines of code.

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Chapter 5

Controlling Access through VBA

In This Chapter

- Working with objects and collections
- Understanding properties and methods
- Using properties and methods in VBA code
- Help with objects, properties, and methods

Using Visual Basic for Applications (VBA) in Access is all about writing code to manipulate Access objects, which is just about everything you see on your screen in Access. Coming up with a simple example is difficult because virtually everything is an object. Every table, query, form, report, page, macro, and module is an object. Every record and field in every table and query is an object. Every control on every form, report, and page is an object. Even the Access menu bar and toolbars are objects that you can manipulate with VBA. (See a pattern here?)

Every object in a database has a unique name. Most objects have properties and methods that VBA can manipulate. The properties and methods exposed by an object are the steering wheels, if you will, that allow VBA to grab hold of an object and take control. The names that define all the objects that VBA can manipulate are organized into an *object model*.

Using VBA in Access is largely a matter of manipulating database objects to achieve some goal. In this chapter, I walk you through the basics of objects that Access exposes to VBA. There are so many objects, properties, and methods in Access that there's really no hope of explaining them all in a single book. There's really no hope of ever memorizing them all, either, because there's just too darn many of them. What you really need is the skill of being able to find the information you need, exactly when you need it. Thus, much of this chapter focuses on that skill.

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Understanding Object Models

An *object model* is a road map, or a sort of the view-from-30,000-feet, of all the objects and properties that VBA can manipulate. Because there are so many thousands of objects, you need a sort of road map to find them, just like how you need a map to navigate unfamiliar territory.

When you view an object model (or portion of an object model), all you see is color-coded boxes arranged in a vertical hierarchy. For example, Figure 5-1 shows a small portion of the Access object model. Notice the legend in this figure, which points out that some boxes represent an object only, yet others represent both an object and a collection.

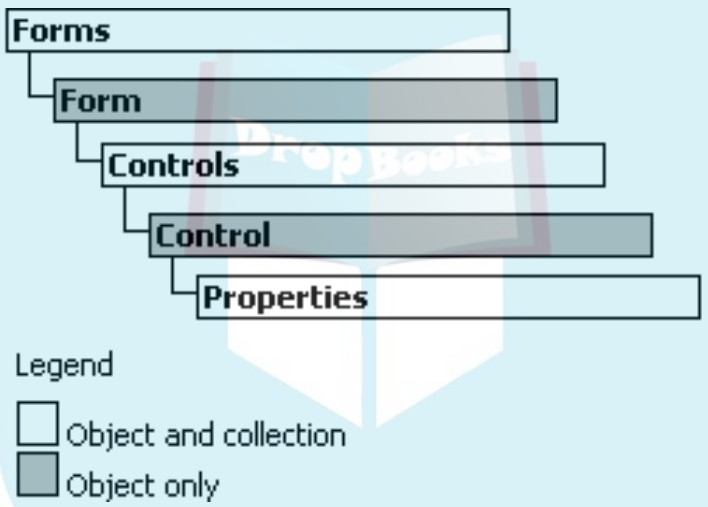

Figure 5-1: Small portion of the Access object model.

Distinguishing between objects and collections

You're no doubt wondering how (or why) a thing could be both an object and a collection at the same time. Start with a simple, real world example: a can of peas. The can of peas itself is an *object* — a unit — that you can buy at most any store and easily carry in your hand. The can, however, is also a *collection* — a repository — of individual peas. Thus, it's both an object and a collection. The same could be said for a carton of eggs: The carton itself is an object, but it can also be a collection because it holds the eggs inside.

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Referring to Figure 5-1, take a look at what each box refers to. The `Forms` collection is a collection of all the currently open forms in a database. When your VBA code is running, it can access any form within that collection of open forms. See how the word `Form` is indented under the word `Forms`. This illustrates that each object in the `Forms` collection is a `Form`. Seems reasonable.

In the object model hierarchy, a `Form` is color-coded as an object and a collection. How can a form (an object) be a collection? If you look at just about any form, you'll see that it contains controls. In fact, a form is a collection of controls. From a programming standpoint, a form is an object that you can manipulate (open, close, print, and so forth) as a unit (an object). However, it's also a `Controls` collection, which contains smaller individual objects (each called a control) that you can manipulate with VBA.

But wait a minute. According to the object model, a control is both an object and a collection. What collection of things does a control contain? Each control has its own collection of properties that uniquely define its name and many other properties. You can see those properties in form design when you select a single control and view its Properties sheet. For example, in Figure 5-2, the combo box control named `Contact Type` is currently selected in Forms design. The Properties sheet in that same figure is showing the properties for that one control.

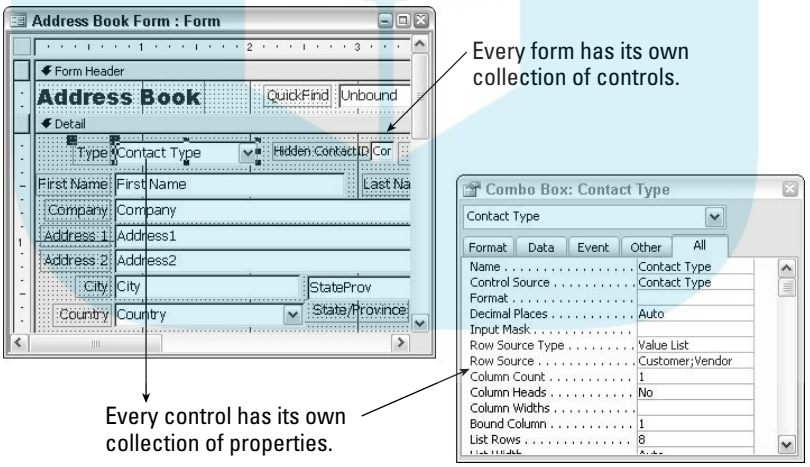
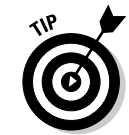


Figure 5-2: Forms hold controls; controls hold properties.



When you're in Access's forms Design view, there are several ways to open the Properties sheet. Use whatever method seems most convenient. Your options are

- Double-click the control whose properties you want to view.
- Right-click a control and choose Properties.

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- Press the F4 key.
- Choose View➪Properties from the Access toolbar.

As you work with VBA in Access, you'll often see little chunks of object modules (like the example shown in Figure 5-1) and smaller. The complete Access object model is too big to even fit onscreen and would be a tight squeeze on a printed page in this book. However, you can always take a look at an entire object model by following these steps:

1. **If you're currently in the Access program window, press Alt+F11 to switch to the VBA editor.**
2. **In the VBA editor's Type a Question for Help box, type** object model**.**
3. **Press Enter.**
4. **In the Help pane, click the name of an object model.**

   In this case, click Microsoft Access Object Model to see the highest-level objects and collections in Access object model.

The selected object model appears in a separate Help window, as in the example shown in Figure 5-3. For help with any object or collection that appears in the model, just click its name in the Help window to see more specific help on that particular object or collection.

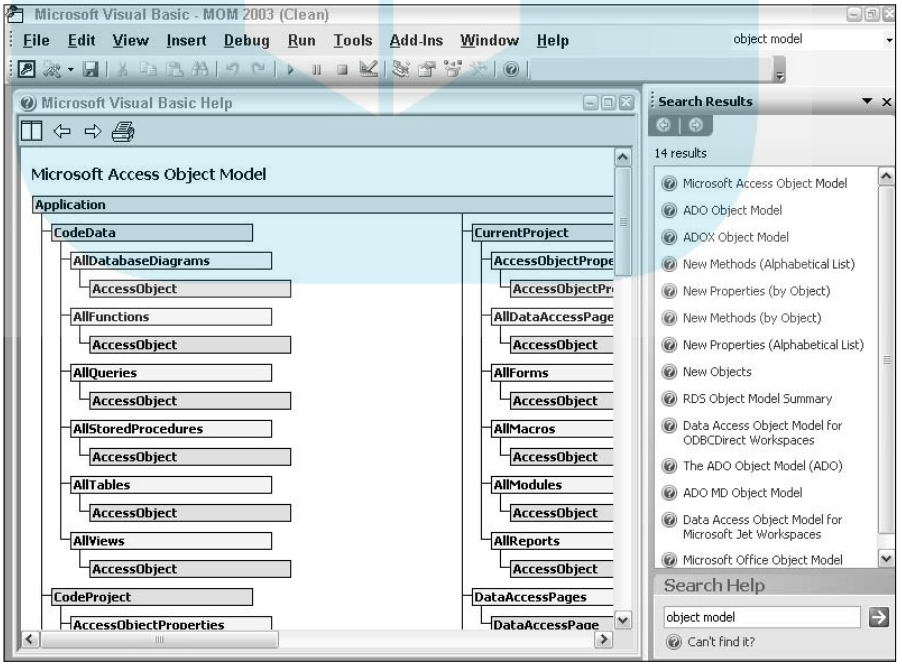

Figure 5-3: View an object model from Help.

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Understanding properties and methods

Every object and every collection exposes at least one property and method to VBA. The difference between a property and a method is as follows:

- **Property:** A characteristic of an object, such as size, color, or font
- **Method:** An action that can be performed upon an object, such as open, close, or copy

The standard syntax for referring to a specific object (or collection) property is to follow the object/collection name with a period and the property name, as follows:

```
ObjectCollectionName.property
```

where *ObjectCollectionName* is a name from the object model, and *property* is a valid property name for that object.

When you type a valid object or collection name followed by a period into the Code or Immediate window of the VB editor, it immediately displays a list of properties and/or methods for that object. For example, if you type

```
Forms.
```

into the Code or Intermediate window, Access immediately displays a list of properties supported by the `Forms` collection in a menu, as in the top of Figure 5-4.

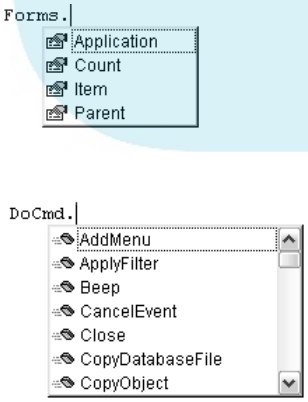

Figure 5-4: Find menus of properties and methods.

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Look at the bottom half of Figure 5-4. `DoCmd` is another object in the Access object model (which I haven't mentioned yet) that offers many methods. Type its name followed by a period

```
DoCmd.
```

into the Code window or Immediate window, and you see a list of methods supported by the `DoCmd` object. After the menu is visible, you can just click any property or method name to add it to the command.

The drop-down lists of property and method names serve as useful reminders for experienced programmers, but beginners need more information than the little lists provide. You can get help with objects and collections by using the same basic techniques that you use for getting help with VBA statements. For example, you can select (double-click) an object or collection name in your code and then click Help (or press F1). Or, you can search the Object Browser for the object/collection name and get help from there. Here's how.

1. **In the VBA editor, open the Object Browser by pressing F2 or by choosing View⇨Object Browser from the VBA editor's menu bar.**
2. **In the left column, scroll to and then click the name for which you want help.**

   For example, for help with the `DoCmd` object, scroll down through the left column and then click DoCmd. Alternatively, you could use the Search tool in the Object Browser to find a specific word. The pane on the right changes to show only properties, methods, and events for the item that you selected at the left.
3. **Optionally, if you want Help for a name in the right-column, click the name with which you want help.**
4. **Press F1 or click the Help button in the Object Browser.**

   For example, if you click DoCmd in the left column and then press F1 or click the Object Browser's Help button, you'll get the Help page for the `DoCmd` object, as in the right half of Figure 5-5.

When you're viewing the help for an object or collection, be sure to look at the headings under See Also. Those offer help with the specific properties and methods exposed by the object.

Classes and members

Don't let the Classes and Members Of headings in the Object Browser confuse you. Think of a *class* as anything that can act as a container (an object or collection). Think of the *members of* as things within the collection.

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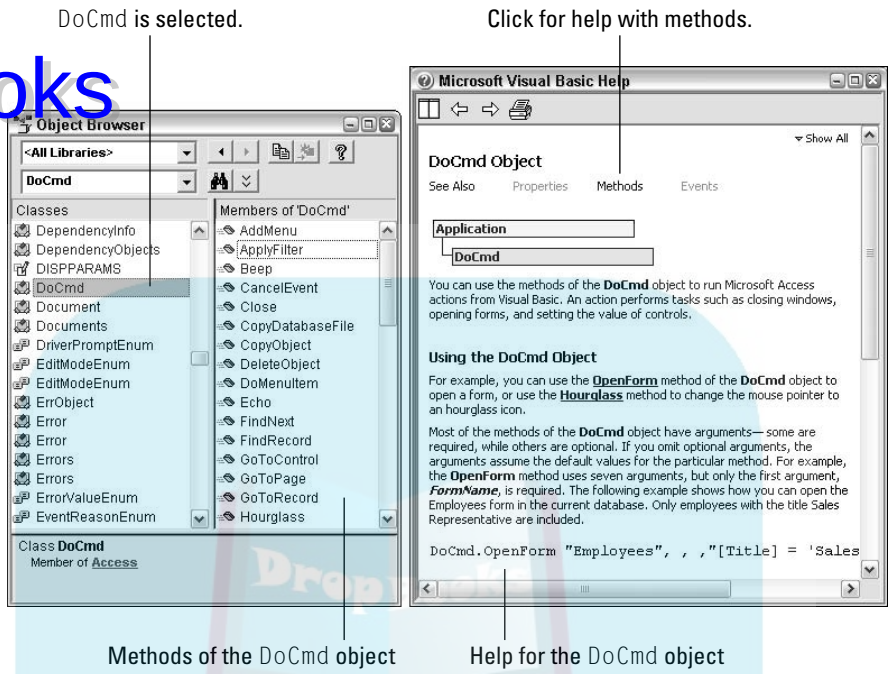

Figure 5-5: Find help in the Object Browser.

Identifying the icons for objects, properties, and methods

The Object Browser, as well as the menus that appear in the Code and Immediate windows, uses icons to help you visually discriminate between objects, properties, methods, and other items in the object model. Table 5-1 briefly describes the meaning of each icon. Refer to the Object Browser in Figure 5-5 (left side) to see some of the icons in action.

Table 5-1 Icons Used in the Object Browser and the Code Window

Icon	*Name*
	Property
	Default Property
	Method

(continued)

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Table 5-1 ***(continued)***

Icon	Name
	Default Method
	Event
	Constant
	Module
	Class (object or collection)
	User Defined Type
	Global
	Object Library
	Project
	VBA Keyword or data
	Enum

Manipulating Properties and Methods

When you write in any language, your ultimate goal is to be clearly understood. You accomplish this by following basic rules of word order and punctuation *(syntax)*. In a sentence in English, for example, nouns, verbs, objects, articles, modifiers, and punctuation fall (usually) in a set way. (*my the ate. dog homework* is unintelligible; *The dog ate my homework.* is correct.)

Likewise, when you write code, you're manipulating the properties and methods exposed by that object, taking into consideration the basic rules of syntax for how you refer to objects, properties, and methods. Understanding those

rules is critical to being able to write VBA code that works. Knowing how it all works will also help you understand and modify existing code.

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Getting the value of a property

The syntax for referring to an object (or collection) property follows the general syntax:

```
objectCollectionName.property
```

where *objectCollectionName* is any valid object or collection name, and *property* is any valid property for that object. The dot (`.`) is the delimiter that separates the object name from the property name.

For example, all collections have a `Count` property that contains the number of items in the collection. Remember that the `Forms` collection is an object that contains all currently open forms in Access. Thus, `Forms.Count` returns the number of open forms in the database. You could see this for yourself by typing the following in the Immediate window and pressing Enter:

```
? Forms.Count
```

As always in the Immediate window, the question mark asks, "What is?" In this case, you're asking the Immediate window, "What is the forms count in this database?" (or, "How many forms are open right now in this database?").

If no forms are open in Access, `Forms.Count` returns `0` (zero). If you open a form (in form view) in Access and then execute the `? Forms.Count` statement again, it returns `1`. In other words, the value returned by `Forms.Count` is equal to the number of forms that are currently open in Access — `0` (zero) if no forms are open, `1` if one form is open, `2` if two forms are open, and so forth.

To re-execute a statement in the Immediate window, just move the cursor back to the end of the statement that you want to execute and then press Enter. To quickly delete text in the Immediate window, drag the mouse pointer through it and press Delete.

Every control on every form has a `Visible` property that determines whether the control is visible on the form. When `Visible` equals `True` (Yes), the control is visible. Conversely, when the `Visible` property is `False` (No), the control is not visible.

When creating your own forms, there might be instances when you want a control to be visible to the user as well as instances when you don't want it to be visible. For example, on a form that allows a user to enter payment information for an order, you might want to make controls for entering credit

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card information visible only when the customer is paying by credit card. If the customer pays by check or cash, you might want to make those same controls invisible so that the user doesn't accidentally choose Cash or Check but then type in credit card information.

The syntax for referring to the `Visible` property of a control named `myButton` is `myButton.Visible`. However, like with Access expressions, getting to a specific object from outside its container requires using an *identifier,* which provides the complete path to the object. For example, the following line

```
Forms!myForm!myButton.Visible
```

refers specifically to the `Visible` property of a control named `myButton` on a form named `myForm`. The `Forms!` part at the beginning refers to the `Forms` collection, which contains all forms that are currently open in Access. Figure 5-6 illustrates how `Forms!myForm!myButton.Visible` refers to the `Visible` property of the `myButton` control.

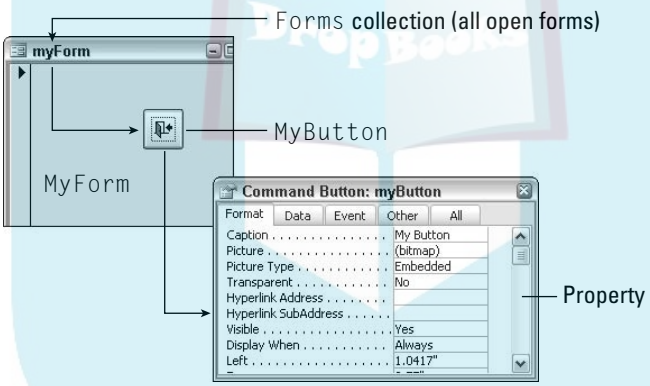

Figure 5-6: `Forms!myForm!myButton.Visible` from an Access viewpoint.

Changing the value of a property

To change the value of a property, follow the property name with an equal sign and a valid value for the property. For example, the `Visible` property of a control can be `True` (Yes) or `False` (No). For example, the following statement makes invisible a control named `myButton` by setting its `Visible` property to `False` (No):

```
Forms!myForm!myButton.Visible = False
```

To make that same control visible again from VBA, set its `Visible` property back to `True` (Yes), as follows:

```
Forms!myForm!myButton.Visible = True
```

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Bang (!) versus dot (.) in identifiers

To refer to specific objects in a database, VBA uses the same identifier syntax used in Access expressions. An identifier can use two different characters as *delimiters* (separators) between words: either an exclamation point (`!`) or a period (`.`). Programmer lingo for these characters is bang and dot, respectively. The rules for using them are as follows:

- `!` (bang): Use the bang character to precede any name you made up yourself, such as the name of a form you created or the name of a control you created on the form.
- `.` (dot): Use a dot to precede a property name or any "official" name that you didn't make up yourself.

For example, in `Forms!myForm!myButton.Visible`, both `myForm` and `myButton` are names that I made up. I did so while creating those objects in Access. Those two names are both preceded by a bang (`!`) character because they're both names I made up.

The final name in the identifier, `Visible`, is a reference to the object's `Visible` property. I didn't make up the name `Visible` myself: Rather, that's Access's name for the property, as you can see in the Properties sheet in Figure 5-6. Because `Visible` is an "official" property name, its name is preceded with a dot (`.`) rather than a bang (`!`).

For more information on identifiers, your best bet is to consult an Access book (as opposed to an Access VBA book, like this one). Or you can just search Access's Help (not VBA's Help) for *identifier*.

Using an object's methods

Methods are actions that you can perform on objects. The syntax for referring to an object's methods in VBA varies. In some cases, referring to a method is the same as referring to a property. You simply follow the object or collection name with a period and the method that you want to apply.

For example, the `DoCmd` (do command) object in the Access object model exposes commands on Access menus and other capabilities to VBA. One of the simplest methods exposed by the `DoCmd` object is the `Beep` method. When applied, it simply makes Access sound the default beep sound. In your own code, you might use `DoCmd.Beep` to sound a beep when a form opens — or when the user makes a mistake — to call attention to the screen.

You can try out the `DoCmd.Beep` method right now, though, via the Immediate window. Just type the following into the Immediate window and then press Enter:

```
DoCmd.Beep
```

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The `Beep` method is pretty straightforward in that it's just one word: beep. Some methods will support one or more arguments, acting as placeholders for information that you want to pass to the statement later. For example, one of the many methods offered by the `DoCmd` object is `OpenForm`. The syntax for using the `OpenForm` method of the `DoCmd` object looks like this:

```
DoCmd.OpenForm FormName, [View], [FilterName],
           [WhereCondition], [DataMode], [WindowMode],
           [OpenArgs]
```

The first argument, *`FormName`*, is required. The remaining arguments, enclosed in brackets, are all optional. (As in the syntax charts you see in Help and the Quick Info, I'll use square brackets to indicate optional parameters in this book.) For example, if the current database contains a form named `Customers`, the following VBA statement will open it:

```
DoCmd.OpenForm "Customers"
```

Multiple arguments must be separated by commas. For example, the following VBA statement uses the `View` argument and the `acDesign` constant to open the form named `OpenForm` in Design view:

```
DoCmd.OpenForm "Customers", acDesign
```

If you want to use multiple arguments but skip over others, you need to type enough commas to get the right place. For example, the optional *`WhereCondition`* argument lets you specify records to display in the form. The following VBA statement opens the `Customers` form, displaying only records that have `CA` in the field named `State`:

```
DoCmd.OpenForm "Customers", , ,"[State]='CA'"
```

The empty commas leave the optional *`View`* and *`FilterName`* arguments empty, ensuring that `[State]='CA'` is passed as the fourth argument, *`WhereCondition`*.

Seeking help with properties and methods

When you're typing VBA statements that involve objects, properties, and methods, you get all the usual quick-reminder Help onscreen. You can always get more help, though. For example, as soon as you type **DoCmd.** (remember to type the period as per the syntax for `DoCmd`), you see a menu of methods that `DoCmd` provides, as in Figure 5-7. It's a lengthy menu, so you have to use the scroll bar to see all the available methods of the `DoCmd` object.

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Single versus double quotation marks

VBA uses the same syntax as Access expressions, where literal numbers are just typed as numbers (like `10`), but literal text and dates must be *delimited* (surrounded by characters). Literal dates need to be enclosed in `#` characters. For example, the date December 31, 2005 needs to be expressed as `#12/31/05#` in an Access expression as well as in VBA. Literal text like the name *Smith* needs to be enclosed in either double quotation marks (`"Smith"`) or single quotation marks (`'Smith'`).

When the syntax of a VBA statement requires its own quotation marks, like the *`WhereCondition`* argument in `DoCmd.OpenForm`, the literal needs to be contained within the entire argument. For example, the following entire expression `StartDate = #12/31/05#` is an entire *`WhereCondition`*, enclosed within quotation marks to satisfy the syntax rules:

```
"StartDate = #12/31/05# "
```

It gets tricky when the expression itself contains quotation marks because you need one pair to delimit the literal text and another pair to delimit the entire expression. You need to use single quotation marks for one pair and double quotation marks for the other pair. Otherwise, Access can't tell which quotation mark belongs to which chunk of text. For example, if the *`WhereCondition`* is `LastName = Smith` and that whole thing needs to be in quotation marks, the following statement will *not* work:

```
"LastName = "Smith" "
```

The reason why it won't work is that the computer always reads one character at a time, left to right. When it "sees" the first quotation mark, to the left of `LastName`, it "knows" that this is the start of some chunk of text enclosed in quotation makes. It keeps reading one character at a time, left to right. When it then "sees" the double-quotation mark in front of Smith, it "thinks" that's the end of the whole chunk and then gets all befuddled and stops working when it sees more stuff after that second quotation mark.

Alternating the single and double quotation marks, as follows, solves the problem:

```
"LastName = 'Smith' "
```

When the computer reads the preceding line, one character at a time left to right, it "sees" the first quotation mark to the left of `LastName`, as always. When it gets to the first single quotation mark before `Smith`, there's no confusion with the first double quotation mark. Access just "knows" that this single quotation mark is the start of some new literal within the current chunk of text.

As the computer continues through left to right, it "sees" the second single quotation mark as the end of the first one that started `Smith`. By the time it gets to the second double quotation mark, it really *is* at the end of the whole chunk of text, so it doesn't get befuddled and fail.

For more information on using literals in Access, refer to a book on Access or search Access's Help (not VBA's Help) for the keyword *literal*. Optionally, you can search Access's Help for the word *expressions* and get more information about literal values from the Help page titled About Expressions.

After you type a method name and a blank space, you see the entire syntax for the method in a Quick Info screen tip, as in Figure 5-8. For the lowdown on how to read Quick Info tips (what all the brackets, bold, italics, and so on mean), check out Chapter 3.

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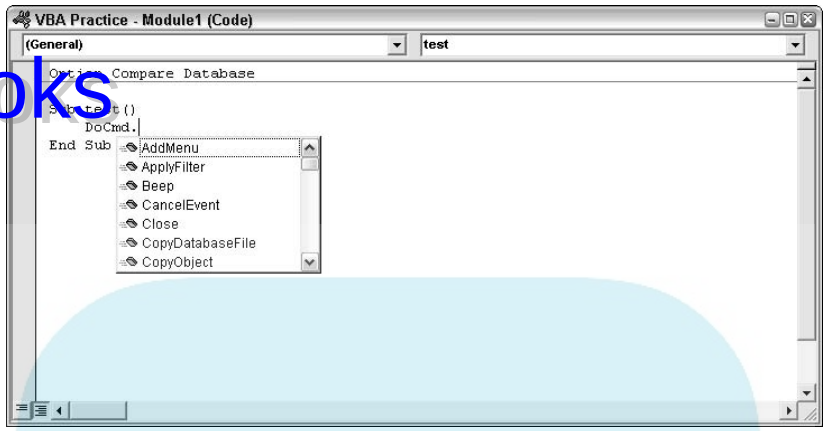

Figure 5-7: Menu of valid entries for the first word after DoCmd.

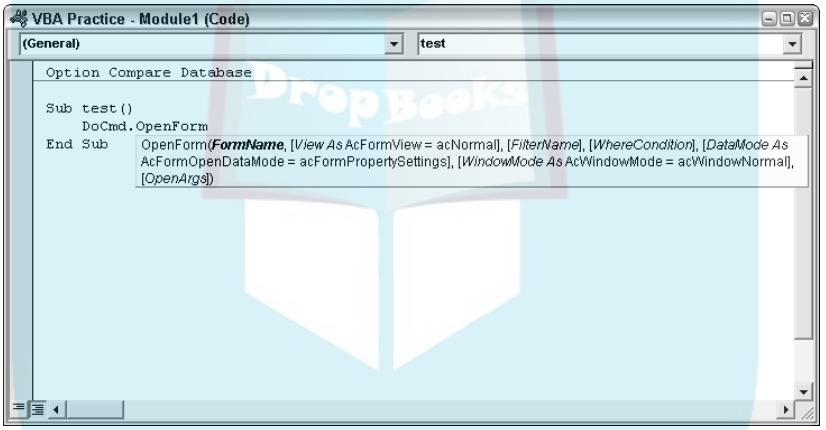

Figure 5-8: Get Quick Info syntax help.

As always, the quick reminders don't provide any detail. When you're first learning, frequent visits to the VBA Help are necessary. There are far too many objects, properties, methods, and keywords to list them all in this book (or even a 1,000-page book). The best skill that you can learn in VBA is how to get exactly the help you need, when you need it.

Fortunately, all the Help methods that work with other VBA keywords work with objects, properties, and methods as well. For example, for help with the `OpenForm` method of the `DoCmd` object, you can do the following:

- **In the Code window:** Type **DoCmd.OpenForm** into the Code window, double-click `OpenForm` to select it, and then press F1 for Help.
- **In the Object Browser:** Find `DoCmd` in the left column, click `OpenForm` in the right column, and click the Help (?) button in the Object Browser.

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As always, a Help window pops up, as in the example shown in Figure 5-9, where you can get more information on the `OpenForm` method.

To summarize (once again), an Access database is a collection of many objects. Most objects have properties (characteristics) and methods (acts that can be performed on the object) that you can manipulate through VBA. To refer to an object, property, or method from your VBA code, you must use exact names and syntax provided by the application's object model.

Trying to figure out how to write a line of new code, or modify an existing line of code just by guessing, is likely to turn into an exercise in hair-pulling frustration. Nobody was ever born already knowing VBA syntax, and even the experts have to make frequent visits to Help to get specific information when they need it. The Help in VBA is your best friend. Learn to use it well!

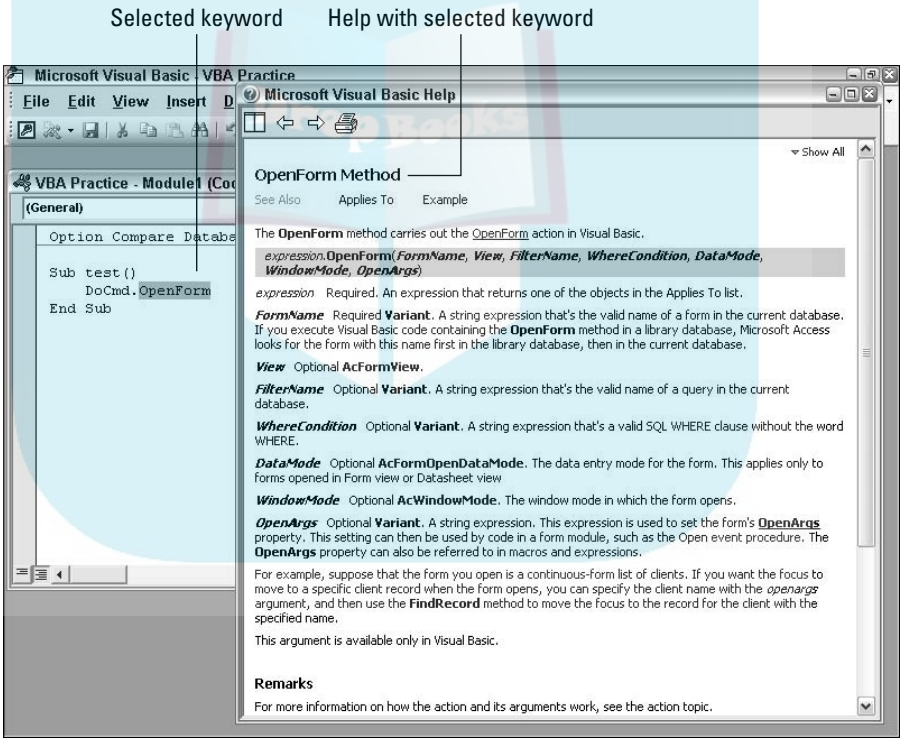

Figure 5-9: Help for the `OpenForm` method.

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Chapter 6

Programming Access Forms

In This Chapter

- Using VBA with Access forms
- Enabling and disabling form controls
- Changing colors, fonts, and special effects
- Opening and closing forms from VBA

One of the most common uses of VBA is to make your Access forms better and easier to use. As a database developer, you always want your forms to make data entry as quick and error-free as possible. Although there's plenty that you can do in Access along those lines without using VBA, you can often make things just a bit better by writing a little VBA code.

In this chapter, I focus on VBA programming techniques that apply specifically to forms. You'll discover how to open forms, change things on a form, and close a form automatically from VBA.

Working with Class Procedures

Every form in a database has a *class module* in which you can store code that's used only by that form. To get to a form's class module, you first have to click Forms in the database window and then open an existing form in Design view or create a new form. Typically, you want to tie your code to an object and event.

For example, a button on a form is an object. Every button has an `On Click` event that occurs whenever a user clicks the button in Form view. If you want to write code that runs every time someone clicks that button, you want to tie the code to that button's `On Click` event.

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To see which events an object on a form offers, first select the object. The name of the object appears in the Properties sheet. In the Properties sheet, click the Events tab. All the events to which you can tie code appear in the Properties sheet.

When you click an event name in the Properties sheet, a Build button (look for an ellipsis) appears to the right (see Figure 6-1). To write code that will be executed each time the event occurs, click that Build button. The first time you do, you see a Choose Builder dialog box. Choose Code Builder and then click OK. The form's class module will open in the VBA editor Code window.

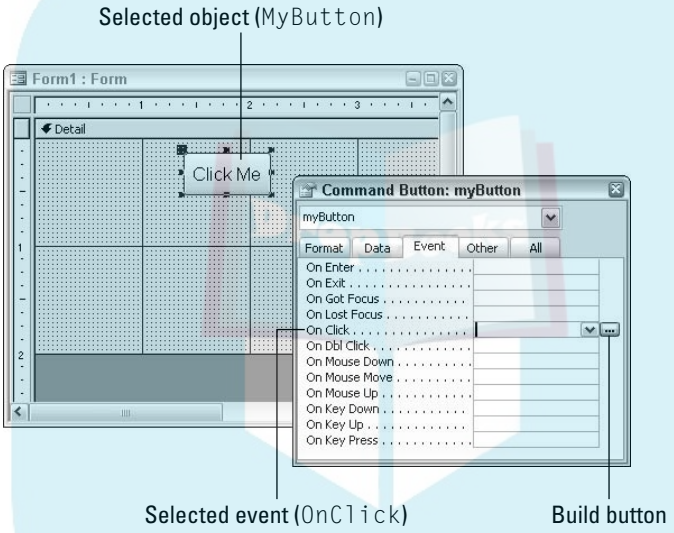

Figure 6-1: Sample control, event, and Build button.

The first and last line of the procedure that will execute in response to the event is already typed into the class module for you. The name of the procedure is a combination of the object and event name, followed by a pair of parentheses. For example, the procedure that executes whenever someone clicks a button named `myButton` is `myButton_OnClick()`. The first and last line of VBA code for that procedure looks like this in the class module:

```
Private Sub myButton_Click()

End Sub
```

Any VBA code that the event is to execute needs to be typed between those two lines of code. After you write your code, choose File➪Save and Return to Microsoft Access from the VBA editor menu bar. The VBA editor closes, and you'll be back to the form's Design screen. There you'll see these words:

```
[Event Procedure]
```

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in the Properties sheet, next to the name of the property for which you wrote the code. In the future, whenever you click that property and click the Build button, you are taken straight to the form's class module, with the cursor already placed inside the procedure.

Every type of control has a unique combination of events to which you can tie code. When you click a control in forms Design, the Event tab in the Properties sheet shows you all the events the control exposes. Some controls offer quite a few more events than the button control shown in Figure 6-1.

You don't need to learn all the events supported by all the different controls right now. There are too many of them, many of which you'll probably never use. But just to give you some examples of events to which you can tie code, I offer the following quick list.

- `On Click` (`Click`): Occurs when the user clicks the control (points to the control and clicks the left mouse button)
- `On Mouse Down` (`MouseDown`): Occurs when the user points to the control and then clicks either the left or right mouse button
- `On Change` (`Change`): Occurs when the contents of a `TextBox` or `ComboBox` control changes, such as when the user edits the contents of field
- `Before Update` (`BeforeUpdate`): Occurs after the user makes a change to data in the control but before the new data is inspected and before the underlying record is updated
- `After Focus` (`AfterUpdate`): Occurs after the user changes the contents of the control, the new data has passed any data validation rules, and the underlying record has been updated

Here's the reason each item in the list above is shown with two names. The first part outside parentheses is the name as it appears in the Properties sheet. The name in parentheses (like `Click`) is the official VBA name and also the name used in any VBA procedure that you tie to the event. For example, if you tie a procedure to the `On Change` event of a control named `PaymentMethod`, that procedure is automatically named `PaymentMethod_Change()`.

So that, in a nutshell, is how you work with class procedures. Examples always help, so your first forays into programming Access forms will all use class procedures to illustrate their techniques.

Remember, a *module* is a container that contains VBA code, where that code is organized into chunks called *procedures.* A *class module* is a module that contains class procedures. The module and the procedures within it belong to the form (or report) to which the class module is attached.

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Enabling Disabling Form Controls

When you work in most programs and dialog boxes, Windows disables (dims) controls that aren't relevant at the moment. You can add that same capability to your Access databases by using some VBA code. For example, you might create a form that allows a user to choose from among different payment options. When the user chooses Credit Card, you want all the fields for entering credit card information to be enabled. When the user selects any other payment method, you want to disable those same controls, as illustrated in Figure 6-2.

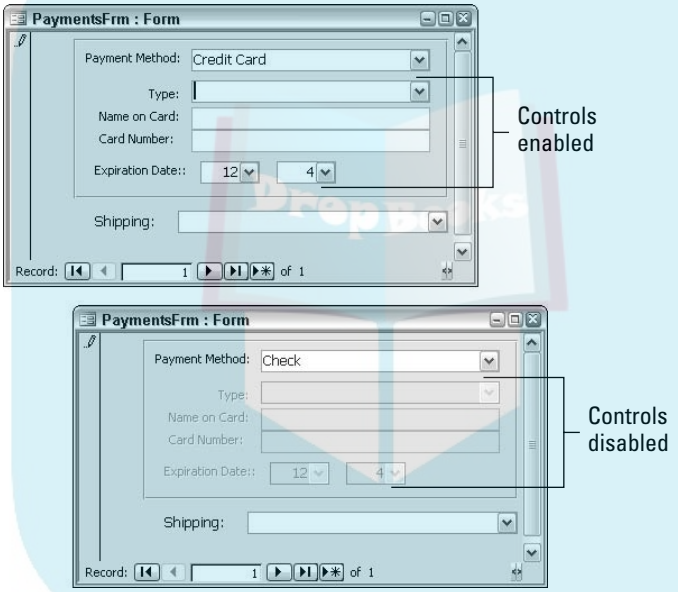

Figure 6-2: Enabled and disabled controls.

For the sake of example, assume that the controls in Figure 6-2 are named (top to bottom) `PaymentMethod`, `CCType`, `CCNameOnCard`, `CCNumber.Enabled`, `CCExpireMonth`, `CCExpireYear`, and `ShippingMethod`. I'll refer to those control names in the sections that follow.

Every control on a form has an `Enabled` property. When that property is `True` (or Yes), the control looks normal. When the `Enabled` property is `False`, the control is disabled and therefore appears dimmed on the form.

To enable or disable a control on a form through VBA, use the general syntax

```
controlName.Enabled = True|False
```

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where *controlName* is the name of the control and *True|False* means that you can use `True` to enable the control and conversely use `False` to disable the control.

For example, the following VBA statement enables a control named `CCType`:

```
[CCType].Enabled = True
```

The following VBA statement disables a control named `CCType`:

```
[CCType].Enabled = False
```

In a class module, any field names without identifiers refer to the current form. For example, it's sufficient to use a field name like `[PaymentMethod]` rather than `Forms![formName]![PaymentMethod]` because the current form is assumed.

Note this one catch to enabling and disabling controls from VBA: You can't disable a control if the cursor is in that control. So in addition to knowing how to enable and disable controls, you also need to know how to position the cursor with VBA. This brings me to the following section.

Using VBA to position the cursor

With VBA, you can move the cursor to any control on a form. In programmer jargon, moving the cursor to a control is called giving that control the *focus*. When you type, your text appears in whatever control on a form currently has the focus.

Square brackets and field names

VBA itself doesn't actually use square brackets. In fact, about the only time you see square brackets in VBA is when you're looking at a syntax chart, where square brackets are used to identify optional — as opposed to required — arguments.

Access, however, does use square brackets when an object name — such as a field, query, form, control, or report name — contains one or more blank spaces. Then, square brackets around the name are required. If the name contains no spaces, square brackets are optional.

Most VBA programmers use square brackets around all Access object names even when they're not required, as in the case of the `[CCType].Enabled = False` example. Using the square brackets makes it easier to distinguish between names that refer to Access objects and words that belong to VBA.

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You can have VBA automatically move the cursor to any control on your form. This can be handy when your code can anticipate where the user is most likely to type next. You can have VBA position the cursor to the appropriate control automatically so that the user can just keep typing and not move the cursor on his own.

The same technique also lets you avoid error messages caused by trying to disable (or hide or lock) the control that currently has the focus. The VBA syntax for setting the focus to a specific control is

```
controlName.SetFocus
```

where *controlName* is the name of the control to which you want to move the cursor. For example, the following statement moves the cursor to a control named `CCType` on the form:

```
[CCType].SetFocus
```

Choosing an object and event for the code

Getting back to the example shown in Figure 6-2, assume that you want your code to either enable or disable the various credit card-related controls (`CCType` through `CCExpireYear`) depending on the current contents of the `PaymentMethod` control. The `AfterUpdate` event of `PaymentMethod` occurs whenever a user chooses a valid option from the `PaymentMethod` control, so you want to tie the code to the `PaymentMethod` control's `AfterUpdate` event.

In forms Design view, click the `PaymentMethod` control to select it and then click `AfterUpdate` on the Events tab of the Properties sheet. The next step is to click the Build button, as shown in Figure 6-3. In the Choose Builder dialog box that opens, choose Code Builder and then click OK.

The form's class module opens, displaying a new, empty `Sub` procedure named `PaymentMethod_AfterUpdate()`, based on the object and event names. In the Code window, the empty procedure appears as below:

```
Private Sub PaymentMethod_AfterUpdate()

End Sub
```

Any VBA code that you place between those two lines is executed every time a user changes the contents of the `PaymentMethod` control.

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Every time the `PaymentMethod_AfterUpdate()` procedure executes, its code needs to make a decision: Should it enable or disable the credit card controls? You can use the VBA `If...Else...End If` keywords to make the decision.

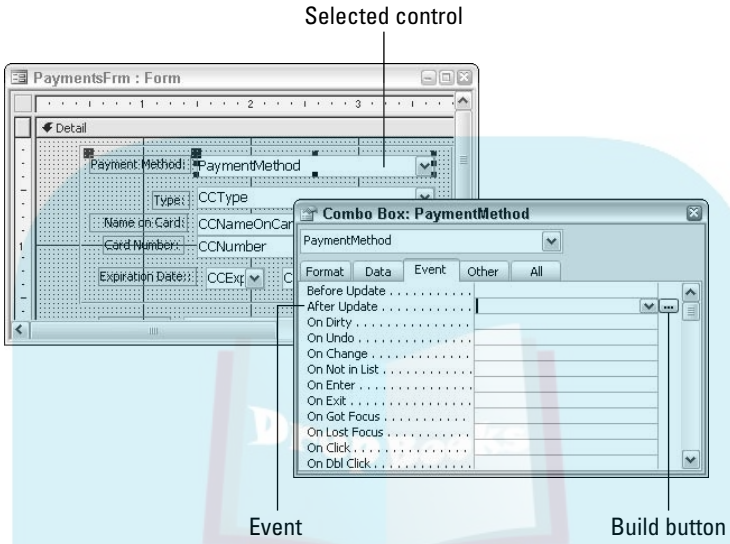

Figure 6-3: The `PaymentMethod` control's `AfterUpdate` event.

See Chapter 4 for more information on the VBA `If...Then...End If` keywords.

Within the `If...Else...End If` statements, the code will position the cursor and enable or disable controls based on the current contents of the `PaymentMethod` control. The logic of the procedure (not written in actual VBA code yet) looks like this:

```
If "Credit Card" is selected in the PaymentMethod Field Then
   Enable the various Credit Card Controls
   Move the cursor to Credit Card Type (CCType) control
Else
   Move the cursor to the ShippingMethod control
   Disable the various Credit Card Controls
End If
```

Writing the code

For the procedure to actually work, that logic needs to be written in VBA language and syntax. Listing 6-1 shows the procedure The sections that follow will look at each step in the procedure more closely.

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Listing 6-1: PaymentMethod_AfterUdate() Procedure

```
Private Sub PaymentMethod_AfterUpdate()

   If [PaymentMethod] = "Credit Card" Then
      'Enable controls for entering credit card info.
      CCType.Enabled = True
      CCNameOnCard.Enabled = True
      CCNumber.Enabled = True
      CCExpireMonth.Enabled = True
      CCExpireYear.Enabled = True

      'Move the cursor to the CCType control.
      CCType.SetFocus
   Else
      'Move the cursor to ShippingMethod control.
      ShippingMethod.SetFocus

      'Disable controls for entering credit card info.
      CCType.Enabled = False
      CCNameOnCard.Enabled = False
      CCNumber.Enabled = False
      CCExpireMonth.Enabled = False
      CCExpireYear.Enabled = False

   End If

End Sub
```

The first line of code in the `PaymentMethod_AfterUpdate` procedure compares whatever is currently stored in the control named `Payment Method`. That line, on its own, reads

```
If [PaymentMethod] = "Credit Card" Then
```

Translated to English, the line says, "If the control named `PaymentMethod` contains the words *Credit Card,* then do the lines below up to `Else`; otherwise, (else) skip the lines under `Else`." The same statement also means, "If the `PaymentMethod` field does not contain the words *Credit Card,* then only do the lines between `Else` and `End If`." Thus, if the `PaymentMethod` control contains the words *Credit Card,* these lines of code execute:

```
      'Enable controls for entering credit card info.
      CCType.Enabled = True
      CCNameOnCard.Enabled = True
      CCNumber.Enabled = True
      CCExpireMonth.Enabled = True
      CCExpireYear.Enabled = True

      'Move the cursor to the CCType control.
      CCType.SetFocus
```

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Those lines ensure that all the credit card controls are enabled and then position the cursor to the `CCType` control (where the user is most likely to make his or her next selection).

If the `PaymentMethod` control does not contain the words *Credit Card,* only the following lines execute. Those lines first move the cursor to the `ShippingMethod` control and then disable the various credit card controls.

```
        'Move the cursor to ShippingMethod control.
        ShippingMethod.SetFocus
        'Disable controls for entering credit card info.
        CCType.Enabled = False
        CCNameOnCard.Enabled = False
        CCNumber.Enabled = False
        CCExpireMonth.Enabled = False
        CCExpireYear.Enabled = False
```

The code moves the cursor to the `ShippingMethod` control first to ensure that the cursor is not in any control that's about to be disabled. The `ShippingMethod` control is also the next control that the user is most likely to work in if he or she didn't choose Credit Card as the payment method.

Saving the procedure

After you type your procedure, choose File➪Close and Return to Microsoft Access. In the form's Design Properties sheet, the words `[Event Procedure]` appear as the property. To test the procedure, switch to Form view and choose a different option from the `Payment Method` control.

Showing and hiding controls

Just like every control on a form has an `Enabled` property, every control also has a `Visible` property. When the `Visible` property is `True` (Yes), the control is visible on the form. When the `Visible` property is `False` (No), the control is invisible in Form view. You can use this property to make controls appear or disappear on the form depending on values in other controls.

For example, the earlier `PaymentMethod_AfterUpdate()` procedure uses the `.Enabled` property to make controls either enabled or disabled. If you simply changed `Enabled` to `Visible` in that procedure, as here:

```
If [PaymentMethod] = "Credit Card" Then
   'Show controls for entering credit card info.
   CCType.Visible = True
   CCNameOnCard.Visible = True
   CCNumber.Visible = True
   CCExpireMonth.Visible = True
   CCExpireYear.Visible = True
```

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```
Else
   'Hide controls for entering credit card info.
   CCType.Visible = False
   CCNameOnCard.Visible = False
   CCNumber.Visible = False
   CCExpireMonth.Visible = False
   CCExpireYear.Visible = False
End If
```

the preceding procedure causes the credit card controls to actually disappear from the form when Credit Card is not selected in the `PaymentMethod` field. The controls will be visible only when Credit Card is selected as the `PaymentMethod`.

Making controls read-only

You can lock and unlock controls on a form by using the `.Locked` property. When a control is *locked,* the user can see the data in the control but cannot change the data. (Hence, you say that the information in the control is *read-only.*) To lock a control from VBA, use the syntax

```
controlName.Locked=True
```

An *unlocked* control is a normal control in which you can see and change the data (called a *read/write control*). To unlock a control from VBA, use the syntax

```
controlName.Locked=False
```

Responding to Form Events

Your code isn't limited to responding to events that happen in form controls. You can also write code that responds to things that happen to the form as a whole. Some common examples include writing code that executes as soon as a form opens or each time the user scrolls from one record to the next in a table. Things that happen to the event as a whole are *form events.*

You can see all the form events whenever you're designing a form in Design view. Choose Form from the drop-down list near the top of the Properties sheet (as shown in Figure 6-4) and then click the Events tab. The `On Current` event (also shown in Figure 6-4) occurs each time the user moves to another record in the form. To write a procedure that executes each time the `On Current` event occurs, click the `On Current` property and click the Build (ellipsis) button that appears to the right. In the Choose Builder dialog box, choose Code Builder and then click OK.

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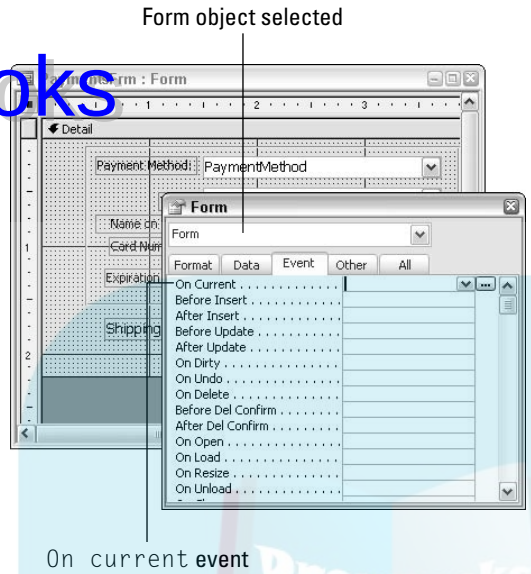

Figure 6-4: Form events in the Properties sheet.

The VBA editor opens, and you see the form's class module in the Code window. The name of the event procedure that you created is `Form_OnCurrent()`. The word `Form` in this context means *the entire form,* and `OnCurrent` refers to the event. The lines that start and end the procedure look like these:

```
Private Sub Form_Current()

End Sub
```

Any code that you place between those lines is executed each time the user scrolls to a new record in the form. As it turns out, this would be a handy addition to the `Payment Methods` example described earlier. Currently, only one event enables and disables credit card controls — changing the contents of the `PaymentMethod` control. The controls won't change when scrolling through records, even when they should.

To remedy the situation, you can use the same code that you used in the `PaymentMethod_OnChange()` procedure to enable and disable controls in the `Form_Current()` procedure. Listing 6-2 shows an example where the `Form_Current()` procedure moves the cursor to a control named `PaymentMethod` and then enables or disables credit card controls on the form based on the contents of the `PaymentMethod` control.

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Listing 6-2: Form_Current() Procedure

```
Private Sub Form_Current()
   'Move cursor to PaymentMethod field.
   PaymentMethod.SetFocus

   If [PaymentMethod] = "Credit Card" Then
      'Enable controls for entering credit card info.
      CCType.Enabled = True
      CCNameOnCard.Enabled = True
      CCNumber.Enabled = True
      CCExpireMonth.Enabled = True
      CCExpireYear.Enabled = True
   Else
      'Move the cursor to ShippingMethod control.
      ShippingMethod.SetFocus

      'Disable controls for entering credit card info.
      CCType.Enabled = False
      CCNameOnCard.Enabled = False
      CCNumber.Enabled = False
      CCExpireMonth.Enabled = False
      CCExpireYear.Enabled = False

   End If
End Sub
```

After writing the code and choosing Close and Return to Microsoft Access, the `On Current` event in the Properties sheet shows `[Event Procedure]`. To test the code, switch to Form view (assuming that the form was bound to a table that contains multiple records).

You don't need to study all the details of every event for every control. There's just too many of them. Here's a quick rundown of some of the more commonly used form events for executing VBA code:

- `Load Event` (`On Load`): Occurs as soon as a form opens in Form view and displays the first record
- `On Current` (`Current`): Occurs when the form is open in Form view and the user scrolls to a new record in the underlying table or query
- `After Insert Event` (`AfterInsert`): Occurs when the user adds a new record to the underlying table (but not when code or a macro adds a new record to the table)
- `Delete Event` (`Delete`): Occurs as soon as a user deletes a record
- `On Close` (`Close`): Occurs after a form is closed and cleared from the screen

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The first-listed name (like `Load Event`) in the preceding list is the name as it appears in the Properties sheet. The second name (like `On Load`) is the VBA name that's added to the procedure name automatically when you tie code to an event. For example, as you can read earlier in this chapter, tying code to a form's `On Current` event creates a procedure named `Form_Current()`. If you create a procedure that executes as soon as a form loads, its name is `Form_Load()`.

Keep in mind that the event to which you tie a procedure simply defines *when* the procedure runs. You define *what* the procedure does, when called, by writing the VBA code within the procedure.

Changing the Appearance of Objects

A form, and each object on a form, contains certain properties that describe the general appearance of the object. Different types of objects have different combinations of appearance properties. When you're working in forms Design, the Format tab of the Properties sheet shows the properties that the currently selected object (or objects) support. For example, Figure 6-5 shows some of the appearance properties available for the selected `TextBox` control on the form.

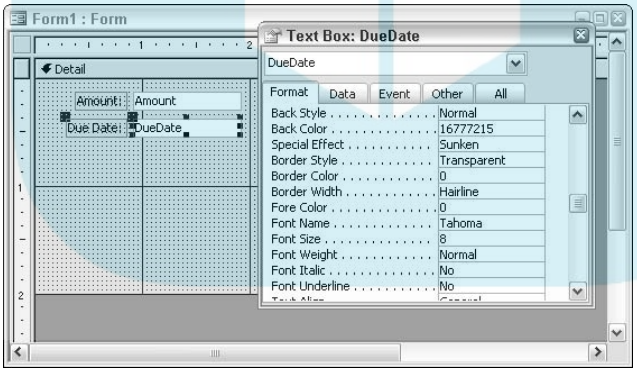

Figure 6-5: Some appearance properties for a `TextBox` control.

Changing colors

Your VBA code can change the color of objects on forms. Such changes can be handy when you use color-coding to call attention to specific items on a form. For example, if your payment is more than 30 days overdue, you might want to choose the amount due to show up in red (to call attention to the value).

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The exact color properties available to you depend on the object for which you're writing code, but some common coloring properties include

- `BackColor`: Defines the background color of a text box, combo box, or form section
- `BorderColor`: Sets the color of the border surrounding a control (providing that border isn't transparent)
- `ForeColor`: Sets the color of text in controls that show text, such as a text box, combo box, or label

When writing code to change the color of any property listed in the preceding list, use the sytntax

```
objectName.property = rgbColor
```

where *objectName* is the name of the object to color, *property* is one of the properties that accepts a color, and *rgbColor* is a color defined as a VBA *ColorConstant* or expression that defines a color as a mixture of red, green, and blue. `ColorConstant`s are just predefined keywords that specify some of the most basic colors, as shown in Table 6-1.

Table 6-1 Basic Color Constants and RGB Values

Color	*ColorConstant*	*RGB Equivalent*
Black	`vbBlack`	`RGB(0,0,0)`
Blue	`vbBlue`	`RGB(0,0,255)`
Cyan	`vbCyan`	`RGB(0,255,255)`
Green	`vbGreen`	`RGB(0,255,0)`
Magenta	`vbMagenta`	`RGB(255,0,255)`
Red	`vbRed`	`RGB(255,0,0)`
White	`vbWhite`	`RGB(255,255,255)`
Yellow	`vbYellow`	`RGB(0,255,255)`

The `RGB()` function allows you to express any of millions of colors. You can use the Color Builder in Access to determine the correct RGB numbers to use to express any color. In forms Design, click the `BackColor`, `BorderColor`, or `ForeColor` property, and then click the Build (ellipsis) button that appears next to the property name. The Color Builder opens, initially showing just the basic colors. Click the Define Custom Colors button to see the whole Color Builder.

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To see the RGB numbers for a color, fist click one of the basic colors. Or, click in the larger rainbow-looking area and then choose a brightness to the right of that. The currently selected color will appear in the Color|Solid box, and the RGB numbers for that color appear to the right. Figure 6-6 shows the basic procedure for finding the three numbers necessary to define a color from the Color Builder.

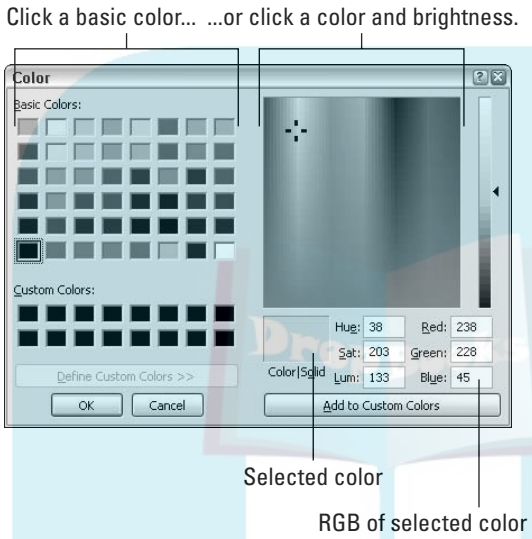

Figure 6-6: Use the Color Builder to determine RGB.

Notice in Figure 6-6 how the selected color is expressed as a mixture of Red (238), Green (228), and Blue (45). The way to express that color using the `RGB` function is simply `RGB(238,228,45)`.

Be aware that backgrounds and borders can also be transparent, meaning they're not visible at all, no matter how you color them. Properties that determine whether an item is transparent or opaque include

- `BackStyle`: When set to `0` (zero), the background is transparent. When set to `1`, the background is opaque and can therefore show color.
- `BorderStyle`: When set to `0` (zero), the background is transparent. When set to `1`, the background is opaque and can therefore show color.

As a simple example, suppose your form contains a control named `DueDate` that contains the date when a payment is due. As you scroll through records in the table, you want `DueDate` to appear in red whenever the payment is more than 30 days past due. Because you want the control to change while you're scrolling through records on the form, you could attach the code to the form's `On Currently` event. The code would appear as below in a class module. (The comment above each line of code tells what the line beneath does.)

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```
Private Sub Form_Current()
   If Date - [DueDate] > 30 Then
      'Make control background opaque.
      DueDate.BackStyle = 1
      'Make control background color white.
      DueDate.BackColor = vbWhite
      'Make font color red.
      DueDate.ForeColor = vbRed
   Else
      'Make control background transparent.
      DueDate.BackStyle = 1
      'Make font color black.
      DueDate.ForeColor = vbBlack
   End If
End Sub
```

When working with more than the basic colors, many programmers prefer to define colors in advance by storing them in variables. To use this method, you must first declare the variable or constant as a `Long` (long integer number), and then use the `RGB` function to assign a value to the variable. For example, the following `Dim` statements declare a bunch of color names as variables containing `Long Integer` data. Lines below the `Dim` statements assign colors to those names:

```
'Delcare some color names as Long Integer variables.
Dim Beige, Brown, Chartreuse, DarkBlue, DarkGreen As Long
Dim Fuschia, Gold, Gray, HotPink As Long
Dim Lavender, Maroon, Navy, Olive, Orange As Long
Dim Pink, Purple, Salmon, Silver, Teal As Long

'Assign colors to variables as RGB values.
Beige = RGB(245, 245, 220)
Brown = RGB(165, 33, 33)
Chartreuse = RGB(127, 255, 0)
DarkBlue = RGB(0, 0, 139)
DarkGreen = RGB(0, 100, 0)
Fuschia = RGB(255, 0, 255)
Gold = RGB(255, 215, 0)
GoldenRod = RGB(218, 165, 32)
Gray = RGB(128, 128, 128)
HotPink = RGB(255, 105, 180)
Lavender = RGB(230, 230, 250)
Maroon = RGB(255, 0, 255)
Navy = RGB(0, 0, 128)
Olive = RGB(128, 128, 0)
Orange = RGB(255, 165, 0)
Pink = RGB(255, 192, 203)
Purple = RGB(128, 0, 128)
Salmon = RGB(241, 128, 114)
Silver = RGB(192, 192, 192)
Teal = RGB(0, 192, 192)
```

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After the color name has been assigned a value, you can use it in your code. For example, the following sets the background color of the form's Detail band to a `Salmon` color:

```
Dim Salmon as Long
Salmon = RGB(241, 128, 114)
Forms!Form1.Detail.BackColor = Salmon
```

For details on creating variables, see Chapter 4.

Controlling boldface, italics, and such

If a control displays text or numbers, you can change the font or style of text through VBA. The property names are self-explanatory, as are the settings for most. As always, *`controlName`* stands for the name of a control on a form. Where you see a pipe (|) separating options, you can use one or the other:

```
controlName.FontBold = True | False
controlName.FontItalic = True | False
controlName.FontName = stringExpression
controlName.FontSize = numberPoints
controlName.FontUnderline = True | False
```

The `.ForeColor` property described in the earlier section "Changing colors" determines the color of text in a box. In other words, `.ForeColor` property actually defines the font color.

For example, to set the font of a control named `Notes` to Courier New, 12 point, with boldface, italics, and underline all turned on (and to make the text red, for added overkill) use these statements:

```
Notes.FontName = "Courier New"
Notes.FontSize = 12
Notes.FontBold = True
Notes.FontItalic = True
Notes.FontUnderline = True
Notes.ForeColor = vbRed
```

Changing special effects

Text boxes and some other controls on forms have a `Special Effect` property that define their general appearance on the form. When you're creating a form in forms Design, you set a control's `Special Effect` property in the Properties sheet. If you want your code to change a control's special effect, use the syntax

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```
controlName.SpecialEffect = setting
```

Where *controlName* is the name of the control whose effect you want to change, and *setting* is either the number or constant as shown in Table 6-2.

Table 6-2 Using a Constant or Number as a SpecialEffect Setting

Appearance	*Number*	*Constant*
Flat	0	acEffectNormal
Raised	1	acEffectRaised
Sunken	2	acEffectSunken
Etched	3	acEffectEtched
Drop-shadowed	4	acEffectShadow
Chiseled	5	acEffectChisel

As an example, the following line of code sets the special effect of a control named `ContactID` to the flat appearance:

```
ContactID.SpecialEffect = acEffectNormal
```

The following line achieves exactly the same result as the above line but uses a number rather than the constant for the setting:

```
ContactID.SpecialEffect = 0
```

Using the With...End With statements

If you want your code to change several properties of a control, you can use a `With...End With` block of code to make your code easier to read. For example, suppose you want your code to change several properties of a control named `myControl` on a form named `myForm` (and the code isn't in a class module), you could include that lengthy identifier on every line of code, as follows:

```
Forms!myForm.myControl.BackStyle = 1
Forms!myForm.myControl.BackColor = vbWhite
Forms!myForm.myControl.ForeColor = vbRed
Forms!myForm.myControl.SpecialEffect = acEffectNormal
Forms!myForm.myControl.FontBold = True
```

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Or, you can use a `With...End With` block of code as follows:

```
With Forms!myForm.myControl
    .BackStyle = 1
    .BackColor = vbWhite
    .ForeColor = vbRed
    .SpecialEffect = acEffectNormal
    .FontBold = True
End With
```

Most programmers prefer to write using the latter format because it makes the code easier to read. When executing the code, VBA understands that `With Forms!myForm!myControl` means that all the property settings to follow (up to the `End With` statement) are to be applied to the object named `Forms!myForm.myControl`.

Filling form controls with data

Controls that can contain data, like `TextBoxes`, `ComboBoxes`, `CheckBoxes`, and such, all have a `.Value` property that define the contents of the control. To put data into a control, use the following syntax where *`controlName`* is the name of the control, and *`value`* is the data you want to put in the control:

```
controlName.Value = value
```

If *`controlName`* refers to a control that's bound to an underlying table, the field in the current record of that table receives the same value as the control.

As an example, suppose you have a form that includes controls named `State`, `SalesTaxRate`, `OrderSubtotal`, `SalesTaxAmt`, and `GrandTotal`, as in Figure 6-7. You want to write some code that does the following:

1. If `State` is CA, put 0.725 (7.25%) in the `SalesTaxRate` control.
2. If `State` is not CA, put 0 (zero) in the `SalesTaxRate` control.
3. Calculate and display the `SalesTaxAmt`.
4. Calculate and display the `GrandTotal` amount.

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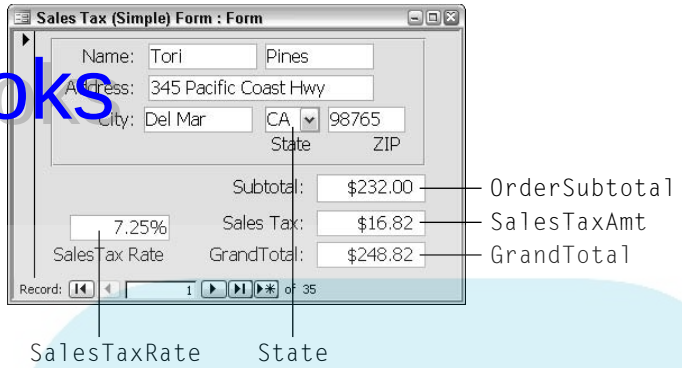

Figure 6-7: A sample form with calculated sales tax.

You need an `If...Then...Else` block of code to make the decision in your VBA code. For the calculations, just use the * (multiplication) and + (addition) operators, as shown here:

```
If [State] = "CA" Then  'If State is CA then...
   '...Set SalesTaxRate to 7.25% for CA
   [SalesTaxRate].Value = 0.0725
Else
   'Otherwise, set SalesTaxRate to zero.
   [SalesTaxRate].Value = 0
End If

'Calculate and show SalesTaxAmt and GrandTotal
SalesTaxAmt.Value = [SalesTaxRate] * [OrderSubtotal]
GrandTotal.Value = [OrderSubtotal] + [SalesTaxAmt]
```

When assigning values to controls, you need to make sure you use the correct data type. For example, if you want to put text in a `Text`, `Memo`, or `Hyperlink` control, enclose the text in quotation marks, as in the following examples (all of which use completely hypothetical control names):

```
anyTextbox.Value = "Smith"
anyHyperlink.Value = "alan@coolnerds.com"
anyHyperlink.Value = "www.coolnerds.com"
```

To put a check mark into a check box, set the check box's value to `True`, as in *anyCheckbox*`.Value = True`. To clear a check box, set its value to `False`, as in *anyCheckbox*`.Value = False`.

If you want to put a specific date into a Date/Time field on a form (or in a table), enclose the date in pound signs (#). For example, the following line assumes that `DateEntered` is the control for a field Date/Time field named `DateEntered`. The code places the date 12/31/05 into that control:

```
[Date Entered].Value = #12/31/05#
```

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To put today's date into a Date/Time field, use the word `Date`, alone, to the right of the equal sign, as `in DateEntered.Value = Date`.

Par for me to confuse things, but I should point out that for many controls, the `.Value` property is assumed if you don't include it in your code. It's important to understand this point when modifying existing code because some programmers might prefer to omit the `.Value` property name. For example, when you see something like this in code

```
[SalesTaxRate] = 0
```

that means exactly the same thing as

```
[SalesTaxRate].Value = 0
```

Both of the preceding VBA statements put the value zero into a control named `SalesTaxRate`.

Opening and Closing Forms

VBA doesn't limit you to working with individual controls on forms. You can work with entire forms as objects, too. For example, VBA can open a closed form and display it onscreen. The `OpenForm` method of the `DoCmd` *(do command)* object gives you great flexibility in exactly how VBA opens a form. The syntax for using the `OpenForm` method of the `DoCmd` object is:

```
DoCmd.OpenForm formName, [View], [FilterName],
            [WhereCondition], [DataMode], [WindowMode]
            [OpenArgs]
```

Only the first argument, *`formName`*, is required. If you omit other arguments, the form opens as it would when you just double-click the form's name in the database window, with all the property settings that are defined in the form's basic design. The optional arguments that allow you to change how the form opens are as follows:

- *`View`*: Specify how you want to open the form displayed using any of the following constants: `acDesign`, `acFormDs` (datasheet), `acFormPivotChart`, `acFormPivotTable`, `acNormal` (the default), `acPreview`.
- *`FilterName`*: If you've previously created and named a folder, use this option to filter records that the form displays. If you haven't created and named a filter, you can use the optional *`WhereCondition`* argument instead to filter records.

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- *WhereCondition*: Use this option to specify a record or records without using a named filter. For example, the `WhereClause "[ContactID]=1001"` displays only records where the `ContactID` field contains 1001. The `WhereClause "[State]='NY'"` displays only records that have NY in a field named State.
- *DataMode*: Determines how the form opens using the constants `acFormAdd` (user can add new records but not edit existing records), `acFormEdit` (users can add or edit data), and `acFormReadOnly` (users can view, but not change, data). The default argument, `acFormPropertySettings`, is used if you omit the argument and opens the form in normal view, honoring the `AllowEdits`, `AllowDeleteions`, `AllowAddItems`, and `DataEntry` properties defined in the form's properties.
- *WindowMode*: Specifies the style of the window when opened using one of the following constants:
  - `acDialog` (opens a dialog box with `Modal` and `PopUp` properties set to `True`)
  - `acHidden` (opens the form in Form view but isn't visible onscreen)
  - `acIcon` (opens the form minimized, leaving only its taskbar button visible)
  - `acWindowNormal` (opens the form with setting defined in its Properties sheet).

  Setting a form's `Modal` and `PopUp` properties to `True` makes the form open as a dialog box. When a form is modal, it must be closed before the user can perform any other action. When the `PopUp` property is enabled, the form stays on top of other open windows on the desktop.
- *OpenArgs*: Specifies additional arguments that can be passed to the form and then processed by other code that manipulates the form.

For example, to open a form named `MyForm` with no special settings (as though you just double-clicked the form's name in the database window), use the simple syntax:

```
DoCmd.OpenForm "MyForm"
```

The following statement opens the form named `myForm` in Design view:

```
DoCmd.OpenForm ("myForm"),acDesign
```

The following statement opens the form named `myForm` in Form view but limits the display of records to those that have (215) as the first five characters of the `Phone` field:

```
DoCmd.OpenForm ("myForm"),,,"Left(Phone,5)='(215)'"
```

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Closing a form

To close a form that's already open, use the `Close` method of the `DoCmd` object and the following syntax:

```
DoCmd.Close objectType, objectName, SaveOptions
```

where

- *`objectType`*: Describes the type of object being closed. Use `acForm` for forms (`acReport` for reports).
- *`objectName`*: The name of the form (or other object) to close.
- *`SaveOptions`*: Specifies how to handle the record currently displayed by the form using one of the following constants:
  - `acSaveYes` (the current record is saved automatically)
  - `acSaveNo` (the current record or any changes made to the record are discarded and not saved)
  - `acPrompt` (displays a prompt asking the user whether he/she wants to save the current record)

As an example, the following VBA statement closes a form named `Address Book Form` and automatically saves the record currently displayed by that form:

```
DoCmd.Close acForm,"Address Book Form",acSaveYes
```

Adding a related record to another table

One of the most common uses of opening forms from VBA is to allow the user to easily enter a record of information with some data already provided. For example, Figure 6-8 shows a sample form named `Address Book Form`. It displays records from a table of names and addresses, where each customer has a unique `ContactID` number.

Suppose that a user has just finished entering the name, address, and other information for a new customer and now wants to switch over to an order form and enter a new order for that customer. When the order form opens, you want it to have already created a new record for the order, put the current customer's `ContactID` value into that order form, and position the cursor to where the user is most likely to type next, such as the `Payment Method` control, as shown in Figure 6-9.

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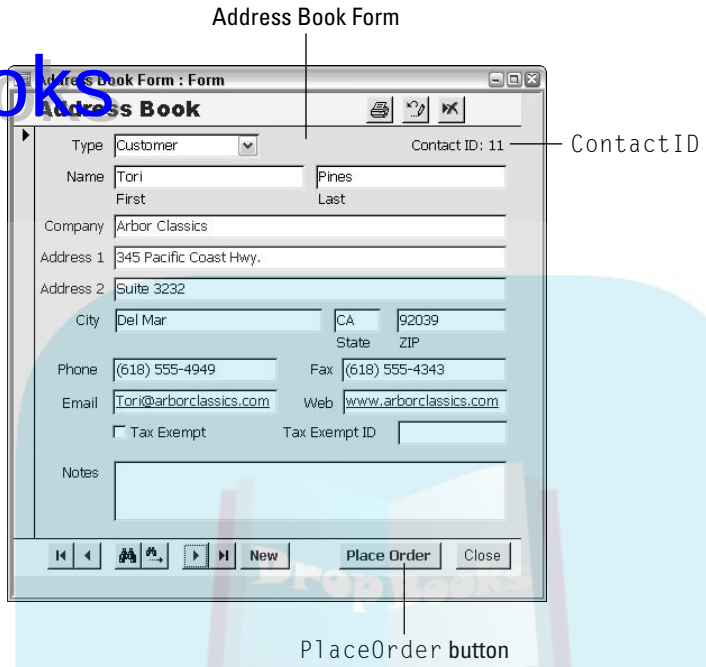

Figure 6-8: Sample address book form and place order button.

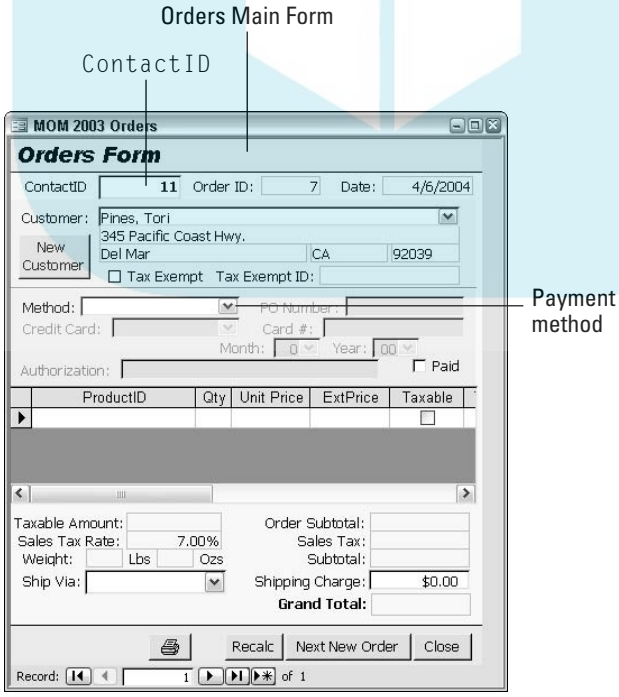

Figure 6-9: Sample order main form.

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To make this work, you need to tie some code to the Place Order button's `On Click` event. That code needs to perform the following steps:

1. Open the order form ready to add a new record.
2. Copy customer's ContactID to ContactID control on order form.
3. Move cursor to convenient control on order form.
4. Close the address book form and save its record.

To start this programming endeavor, open `Address Book Form` in Design view, click the Place Order button, click the Event tab in the Properties sheet, click the Build button in the Properties sheet, and choose Code Builder. As always, you'll be taken to the class module for the form. The cursor will be in a new `Sub` procedure whose name reflects the button and `On Click` event, as follows:

```
Private Sub PlaceOrder_Click()

End Sub
```

Next, you need to convert the plain-English steps that the procedure needs to take into actual VBA code. The complete procedure, as it appears in the VBA editor Code window, is shown in Listing 6-3.

Listing 6-3: Form_Address Book Form

```
Private Sub PlaceOrder_Click()
    'Open the order form ready to add a new record.
    DoCmd.OpenForm "Orders Main Form", acNormal, , , acFormAdd

    'Copy customer's ContactID to ContactID control on order form.
    Forms![Orders Main Form]!ContactID.Value = Me![ContactID].Value

    'Move cursor to convenient field in order form.
    Forms![Orders Main Form]![Payment Method].SetFocus

    'Close the address book form and save its record.
    DoCmd.Close acForm, "Address Book Form", acSaveYes

End Sub
```

More DoCmd methods for forms

The `DoCmd` object used in the preceding example to open and close forms provides many methods for working with data on forms. Table 6-3 summarizes some of the more commonly used `DoCmd` methods for working with forms and data in forms.

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Table 6-3 Commonly Used DoCmd Methods

To Do This	*Use This*
Move cursor to a specific control	`DoCmd.GoToControl`
Select object	`DoCmd.SelectObject`
Move to a specific record	`DoCmd.GoToRecord`
Find a record	`DoCmd.FindRecord`
Find next matching record	`DoCmd.FindNext`
Filter records in a form	`DoCmd.ApplyFilter`
Remove filter	`DoCmd.ShowAllRecords`
Sound a beep	`DoCmd.Beep`
Print form (or other object)	`DoCmd.PrintOut`
Save form (or other object)	`DoCmd.Save`
Perform a command from the menu bar	`DoCmd.RunCommand`
Copy a form (or other object)	`DoCmd.CopyObject`
Rename form (or other object)	`DoCmd.Rename`
Delete a form (or other object)	`DoCmd.DeleteObject`
Send object electronically	`DoCmd.SendObject`

You don't need to study and memorize them all now because you can easily get detailed information on an as-needed basis. Just type the beginning of the statement into your code, as follows:

```
DoCmd.GoToRecord
```

Just double-click the method name (such as `GoToRecord`) to select it and then press F1.

The Object Browser, which is always available in the VBA editor, provides another great resource for getting quick information on methods of the `DoCmd` object (as well as every other object in your database). To open the Object Browser in the VBA editor, choose View➪Object Browser from the VBA editor's menu bar or press F2 while you're in the VBA editor.

See Chapter 2 for more information on using the Object Browser.

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After the Object Browser is open, click DoCmd in the left column. The methods that DoCmd supports will be listed down the right pane. For help with a particular method, click its name in the right column and then click the Help button near the top of the Object Browser (see Figure 6-10).

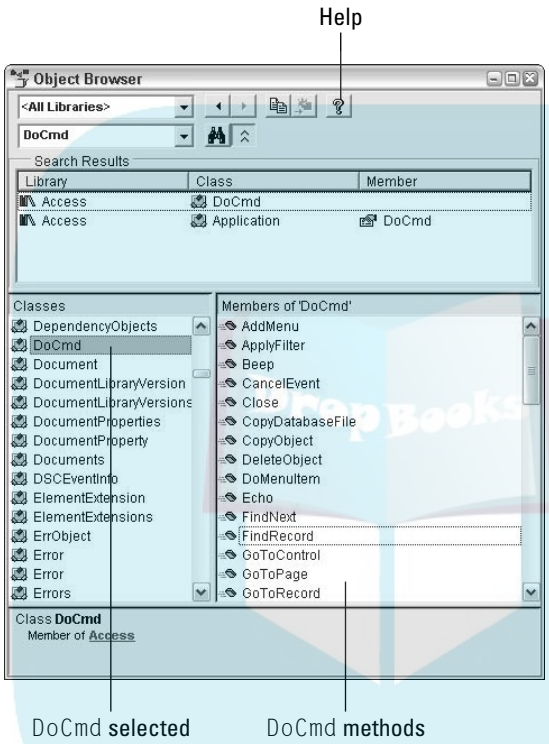

Figure 6-10: Methods of the DoCmd object in the Object Browser.

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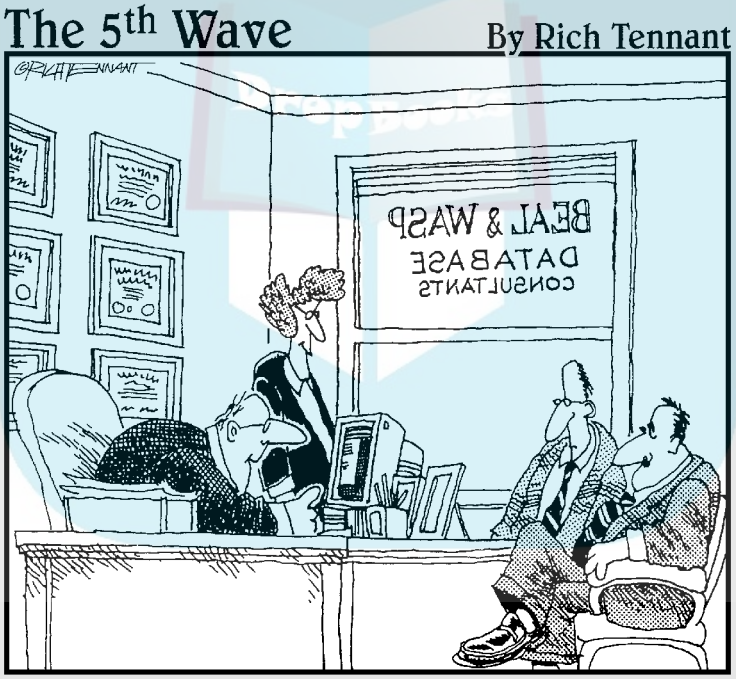
Part III

VBA, Recordsets, and SQL



"Your database is beyond repair, but before I tell you our backup recommendation, let me ask you a question. How many index cards do you think will fit on the walls of your computer room?"

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In this part . . .

I suppose the first thing the title of this part brings to mind is, "What is an SQL recordset (and why would I care to know)?" If you've been faced with any VBA code in the past, you've probably seen the word *recordset* sprinkled throughout many a VBA procedure. Either way, SQL recordsets are basically a means of letting VBA work directly with the data in your tables, where it can do all kinds of useful work for you. This part is mostly about managing data in Access tables with VBA and recordsets.

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Chapter 7

The Scoop on SQL and Recordsets

In This Chapter

- What SQL is and why it matters
- Writing SQL without knowing SQL
- Creating tables and deleting tables with VBA
- Adding, changing, and deleting table records with VBA
- Creating and using recordsets

You don't have to be involved with database management for long before the *SQL* acronym starts rearing its head. SQL (*ess-cue-ell;* often pronounced *SEE-quel*) stands for Structured Query Language. As the name implies, SQL is a language for defining which fields and records you want from a table. Actually, it's not just *a* language: It's more like *the* language for getting data from tables because it can be used in virtually all database management systems.

In this chapter, you'll discover what SQL is all about, how it applies to Access, and how you can use SQL in VBA to do the jobs that queries do in regular interactive Access. As you'll see, a SQL statement is basically a query that's been converted to words. And although you can just drop the Query Design screen into code (because it's a screen and not words), you can certainly drop an SQL statement (which is just words) into your code.

What the Heck is SQL?

Although you might not realize it, every time you create a query in Access, you're actually creating an SQL statement. This is a good thing because as a rule, creating a query in Access is a lot easier than writing an SQL statement from scratch.

To illustrate how every query is really a SQL statement in disguise, Figure 7-1 shows a basic Access `Select` query that (in Datasheet view) displays some fields and records from a table.

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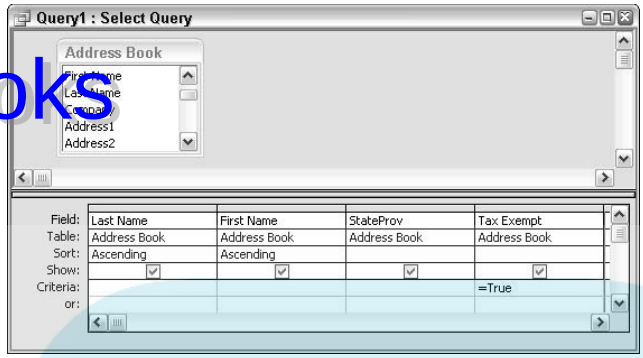

Figure 7-1: Simple, sample select query.

So where's the SQL statement in Figure 7-1? Well, it's not visible when you're looking at the query in Design view. To see the SQL statement that defines a query, right-click the title bar of the query Design screen and choose SQL View. The whole window changes, hiding the QBE (Query-by-Example) grid and displaying the SQL statement that the query actually performs, as in Figure 7-2.

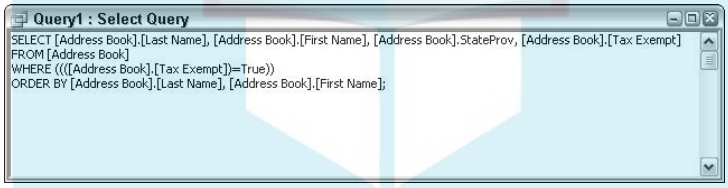

Figure 7-2: SQL statement for the query in Figure 7-1.

At first glance, the SQL statement and query might seem to be unrelated. However, if you look closely at the SQL statement, you'll see that it is indeed a reflection of what the query says. The syntax of an SQL statement generally looks like this:

```
SELECT fieldnames FROM tableName WHERE condition ORDER BY
            field(s)
```

where

- *fieldnames* is a list of fields from the underlying table to be displayed by the query (or SQL statement).
- FROM *tableName* specifies the name of the table from which the data is being drawn.

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- `WHERE condition` is an expression specifying which records to include in the query.
- `ORDER BY field(s)` lists the names of used for sorting (alphabetizing) records in the query results.

If I take the repetitive table name `[Address Book]` out of the sample SQL statement shown in Figure 7-1 (just to make the statement a little easier to read), the SQL statement is actually this:

```
SELECT [Last Name], [First Name], [StateProv], [Tax Exempt]
FROM [Address Book]
WHERE ((([Tax Exempt])=True))
ORDER BY [Last Name], [First Name];
```

Figure 7-3 shows how the various parts of the QBE grid in fact do correspond to text in the SQL statement. Note the following:

- The fields listed across the Field row specify the fields to display (for example, `SELECT [Last Name], [First Name], [StateProv], [Tax Exempt]`).
- The table name in the top half of the grid specifies where the fields and records will come from (for example, `FROM [Address Book]`).
- The `WHERE` clause gets its expression from the Criteria rows of the QBE grid (for example, `WHERE [TaxExempt] = True`).
- The `ORDER BY` fields come from the Sort row in the grid (for example, `ORDER BY [Last Name], [First Name]`).

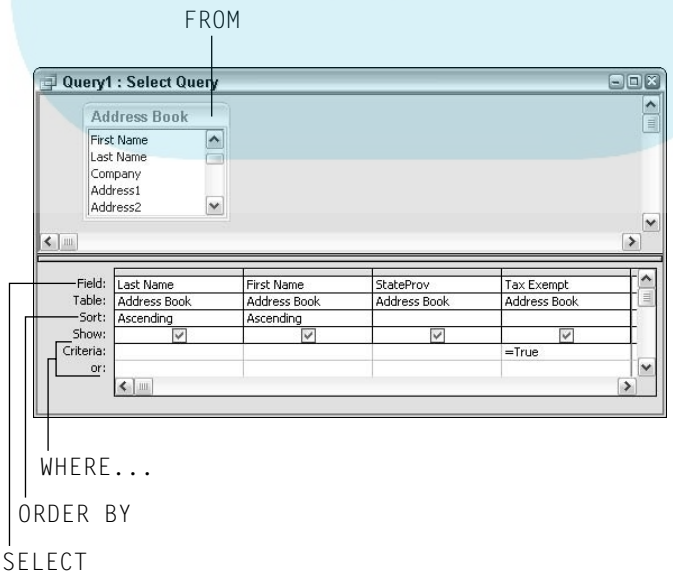

Figure 7-3: How parts of a query translate to an SQL statement.

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Writing SQL without knowing SQL

The example I've shown you is just an example. Every query has a corresponding SQL statement. You can prove this to yourself by opening any query in any Access database, anywhere. Right-click that query's title bar and choose SQL View, and there you'll see that query's SQL statement. Right-click the title bar again and choose Query Design, and you're back to the Query Design grid.

The real beauty of it all is that you really don't need to learn SQL to write SQL statements. If you know how to create an Access query, you know how to write SQL statements because you can just create your query to do whatever you want it to do. Then right-click and choose SQL View, and there's your SQL statement. Drag the mouse pointer through that statement to select it, press Ctrl+C to copy it, and then you can just paste the SQL statement wherever you want.

You could even discard the original query after you have the SQL statement because the SQL statement and query are essentially one in the same. The only real difference is in how you use them. To do a query in Access, you create the query and switch to Datasheet view to see the results. To do the query from VBA, you execute the SQL statement instead.

The bond between Access queries and SQL is a two-way street. For example, suppose that the current database has a table like `Address Book` shown in earlier figures in this chapter, and I type the following SQL statement into some text editor like Notepad:

```
SELECT [Last Name], [First Name], [City], [StateProv]
FROM [Address Book]
WHERE (((StateProv)="CA"))
ORDER BY [Last Name], [First Name];
```

Now suppose I go into Access and create a new query but don't add any tables to it. I just have a blank QBE grid to start with. In that query, I right-click the title bar and choose SQL View. Then, say I copy and paste (or type) the preceding SQL statement into a window that displays the SQL statement. Intuitively, this might seem weird because normally the query creates the SQL statement, not the other way around. But given the two-way street of SQL and Access queries, going back to Query Design view after entering the SQL statement almost miraculously translates the SQL statement into a QBE grid, as in Figure 7-4.

It's a lot easier to create a query in the query Design grid and convert it to SQL than it is to write an SQL statement and convert it to a query. If you put an incorrectly written SQL statement into the query, it won't translate. In

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truth, I doubt anyone would ever go to the trouble of writing out a SQL statement first to create a query. The point is that an SQL statement *is* an Access query. It's just that an SQL statement is a query expressed in words (which can be placed in VBA code) rather than a query expressed as information in a QBE grid (which can't be dropped into VBA code).

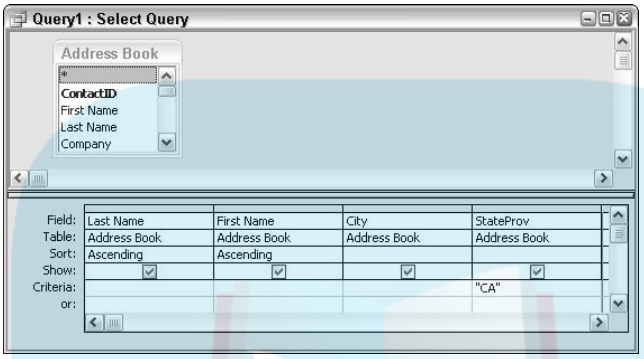

Figure 7-4: Sample SQL statement translated to an Access query.

Exactly how you use SQL in VBA is a long story, which this chapter and the next will describe in detail. Also, not all SQL statements contain exactly the words `SELECT`, `FROM`, `WHERE`, and `ORDER BY`. Although there are lots of different words you can use in SQL to perform different kinds of tasks, the first thing you need to realize is that an SQL statement is just an Access query expressed as words rather than graphically on a grid.

Select queries versus action queries

So far in this chapter, I've really only talked about Access select queries. That type of query gets its name from the fact that it only *selects* fields and records from a table. A select query will never alter the contents of a table.

An action query is different from a select query in that an action query actually does change the contents of a table. In Access, you create action queries in much the same way you create select queries. You start off by creating a new, regular query, so you're at the Query Design grid. Then you choose the type of action query you want to create from the Access Query menu, shown in Figure 7-5.

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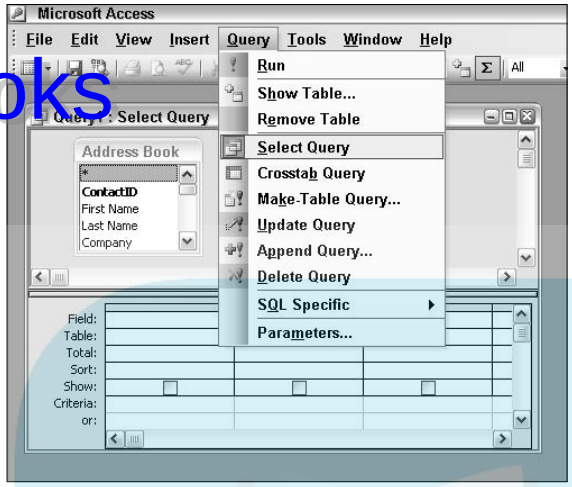

Figure 7-5: The Query menu in Access.

The main types of action queries that you can create, their purpose, and relevant SQL buzzwords (described in the sections that follow) are summarized in Table 7-1.

Table 7-1 Access Action Query Types and Corresponding SQL

Action Query Type	*Purpose*	*Relevant SQL Buzzwords*
Make-Table query	Make a new table using data from an existing table.	`SELECT...INTO`
Update query	Change multiple fields and records within a table.	`UPDATE...`
Append query	Add records from one table to the bottom of some other table.	`INSERT INTO...`
Delete query	Delete multiple records from a table.	`DELETE`

The changes that an action query makes to a table can be extensive and permanent! Never test or play around with action queries on data you actually need. It would be a shame (putting it mildly) to test out a delete query on your only copy of 10,000 names and addresses, only to realize that it worked — and now you have 11 names and addresses in your table and no backup.

After you create an action query in Access, you still have to run the query before it will actually make any changes to your database. To run an action query in Access, you need to have the action query open and visible onscreen

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in Design view. From there, you click the Run (!) button on the Access toolbar or choose Query➪Run from the Access menu bar to run the query.

Every action query that you create is also a SQL statement, just like when you create select queries. You get to an action query's SQL statement just like you do a select query's — by right-clicking the title bar in Query Design and choosing SQL View. For example, Figure 7-6 shows an update query that changes the value of a field named `SentWelcome` to `True` wherever that City field contains "Houston". (Note the words Update Query in the title bar and the Update To row in the QBE grid.)

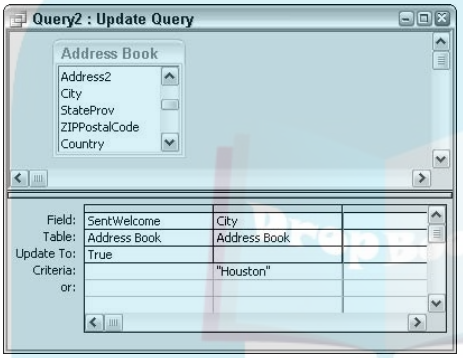

Figure 7-6: Sample update query in Query Design.

Right-clicking the title bar shown in Figure 7-6 and choosing SQL View reveals the SQL version of the query. Because this is an update query, the SQL statement doesn't start with `SELECT`. Rather, it starts with `UPDATE`, as follows. But still, the SQL statement is perfectly valid and will run just fine as VBA code. You can select and copy the SQL statement just as you could any other.

```
UPDATE [Address Book] SET SentWelcome = True
WHERE (((City)="Houston"));
```

Getting SQL into VBA

So the bottom line here, once again, is that if you know how to create queries in Access, you know how to write (most) kinds of SQL statements. I mention earlier that you can copy and paste a SQL statement just like you can copy and paste any other hunk of text that you see onscreen. But I'd be lying if I said you just have to drop the SQL statement into your VBA code to make it work. Here are the reasons why it's not that simple:

- You need to get rid of the semicolon (;) at the end of the SQL statement in SQL view. (VBA doesn't like that last semicolon.)

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- If the SQL statement is broken into multiple lines, you need to unbreak it back to a single line (with exactly one blank space between each).
- The whole statement needs to be placed inside quotation marks (alternating single and double quotation marks).
- If the SQL statement represents an action query, the whole SQL statement needs to be preceded by `DoCmd.RunSQL` in your code.

Look at an example starting with the `UPDATE` SQL statement shown earlier. When you copy and paste the statement into VBA code, the entire statement will turn red, indicating a problem. The only real problem, though, is that things do need to be reformatted a bit.

First, you need to unbreak the lines so that the whole SQL statement is on one, long line in the code. Move the cursor to the end of the top line, press Delete (Del) to unbreak the line, and then press the spacebar to insert a blank space where the line break used to be.

Next, you need to get rid of the semicolon at the end of the statement and put the whole statement into quotation marks. You can use either single (') or double (") quotation marks. However, if any quotation marks are already in the statement, you can't use the same type. For example, the sample SQL statement has a pair of double-quotation marks around the word "Houston", as follows:

```
(City) = "Houston"
```

To avoid a conflict with the embedded quotation marks, you either have to use single quotation marks to enclose the whole SQL statement, as follows:

```
'UPDATE [Address Book] SET SentWelcome = True WHERE (((City)="Houston"))'
```

Or, you have to change the inner quotation marks to single quotes, and then use double quotation marks around the whole statement, as follows:

```
"UPDATE [Address Book] SET SentWelcome = True WHERE (((City)='Houston'))"
```

Finally, VBA doesn't recognize SQL as being different from any other code in the procedure. So to tell VBA that the statement is SQL and that you want VBA to execute the statement, add `DoCmd.RunSQL` to the start of the line:

```
DoCmd.RunSQL "SELECT [City], [StateProv] FROM [Address Book] WHERE
              ((([StateProv])='CA'))"
```

The final statement in the VBA editor, after making all the necessary changes, will look like this:

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```
Sub whatever()

    'Set SentWelcome field to True for all Houston addresses.
    DoCmd.RunSQL "UPDATE [Address Book] SET SentWelcome = True WHERE
              (((City)='Houston'))"

End Sub
```

Hiding warning messages

Typically when you run an action query — whether from Access or VBA — you get a warning message about what the query is about to do. That gives you a chance to change your mind before the query executes. However, when you're running action queries from VBA, you might want them to just do their thing without displaying any warnings or asking the user for permission.

The `DoCmd` object provides a simple means of hiding those warning messages. To prevent a warning message from appearing when your code runs an action query, place the following line anywhere above the line that runs the action query:

```
DoCmd.SetWarnings False
```

To get warning messages back to normal after the query runs, use this statement in your code:

```
DoCmd.SetWarnings True
```

The following shows the sample procedure from the end of the preceding section with appropriate code added to hide warning messages just before the query runs and then set the warnings back to normal.

```
Sub whatever()

     'Hide warning messages presented by action queries.
     DoCmd.SetWarnings False

     'Set SentWelcome field to True for all Houston addresses.
     DoCmd.RunSQL "UPDATE [Address Book] SET SentWelcome = True WHERE
              (((City)='Houston'))"

     'Get warning messages back to normal.
     DoCmd.SetWarnings True

End Sub
```

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In case you're wondering . . . because select queries don't actually change data, do they show warnings? The answer to that is a definite no. In fact, if you just run a select query by using `DoCmd.RunSQL` in code, absolutely nothing happens onscreen at all. That's because to use select queries in VBA, you have to store the results of the query in a *recordset*. I talk about how recordsets work in Chapter 8. In this chapter, I stay focused on action queries (and SQL statements) that actually make changes to data stored in tables.

Storing SQL statements in variables

You can store SQL statements in variables, just as you can store text in variables. This can help with those extremely long SQL statements that seem to extend out forever past the right margin of the Code window. Many programmers will use this technique of building a long SQL statement out of smaller chunks, storing the statement in a variable. As an example, here is a series of VBA statements that build and execute a single length SQL statement from smaller chunks

```
'Create string variable (storage place) named mySQL.
Dim mySQL As String

'Add lengthy SQL statement to mySQL in chunks.
mySQL = "UPDATE Orders SET"
                'Leading spaces below ensure spaces between words.
mySQL = mySQL + " InvRecPrinted = True, Label Printed = True"
mySQL = mySQL + " WHERE (((PONumber) Is Null)"
mySQL = mySQL + " AND ((CCType)='MC'))"
'Line above uses single quotation marks inside double quotation marks.

'Now, mySQL contains the complete SQL statement,
'so hide warnings and execute the SQL statement.
DoCmd.SetWarnings False
DoCmd.RunSQL mySQL

'Update query has now been performed. Back to normal warnings.
DoCmd.SetWarnings True
```

For the goods on variables, read about storing data in variables and constants in Chapter 4.

As daunting as the preceding code looks, it's not so bad if you read it as it would execute, one step at a time from top to bottom. The first statement, `Dim mySQL As String`, sets aside a little cubbyhole of storage space in which you can store some text. In code, refer to the contents of that cubbyhole as `mySQL` (although I could have used any name here).

The next statement, `mySQL = "UPDATE Orders SET"`, stores the chunk of text in the quotation marks in the `mySQL` variable. So now the cubbyhole contains `"UPDATE ORDERS SET"`.

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The next statement changes the contents of that variable by creating a new string that consists of the current contents of the variable (`mySQL`) plus (+) the string `" InvRecPrinted = True, LabelPrinted = True"`. By the time that line is finished being executed, the `mySQL` variable contains `UPDATE Orders SET InvRecPrinted = True, LabelPrinted = True`. Notice the addition of the blank space at the start of the string. That blank space is also added onto the string to make sure there's a blank space between `SET` and `InvRecPrinted`.

The following two lines of code do the same as the previous line in that each adds more text to the string stored in `MySQL`. The `mySQL = mySQL + " WHERE (((PONumber) Is Null)"` statement tacks part of a `WHERE` clause (criterion) onto the string (again preceded by a blank space). Then the statement `mySQL = mySQL + " AND ((CCType)='MC'))"` tacks on a blank space and its chunk of text.

The single quotation marks inside the string are required to avoid conflict with the double quotation marks surrounding the whole string.

By the time that the final `MySQL = MySQL + . . .` statement has executed, the variable named `mySQL` contains the following SQL statement, which exactly matches all the syntax required of a valid SQL statement. (The statement is too lengthy to show on one line in this book, but in the mySQL variable, it definitely is one long valid SQL statement. (Like most SQL statements that you'll see in this book, the example below is just a copy-and-paste job from a query's SQL view.)

```
UPDATE Orders SET mySQL = mySQL + " InvRecPrinted = True, LabelPrinted = True
              WHERE (((PONumber) Is Null) AND ((CCType)='MC'))
```

The next statement in the code, `DoCmd.SetWarnings False`, just hides the warning message that action queries otherwise show. Then comes the actual execution of the SQL statement in the following statement:

```
DoCmd.RunSQL mySQL
```

By the time VBA gets to this statement, it knows that the name `mySQL` refers to a cubbyhole that I told it to create earlier. So it knows that it really needs to replace the name `mySQL` with the contents of the variable named `mySQL` before it does anything else. First, it does a quick substitution, replacing the variable name with its contents, as follows:

```
DoCmd.RunSQL UPDATE Orders SET InvRecPrinted = True, LabelPrinted = True WHERE
              (((PONumber) Is Null) AND ((CCType)='MC'))
```

The preceding statement is what VBA actually does when it executes the statement. It runs the update query specified in the SQL statement. (Technically, it's all executed as one long line — it's just too wide to show it that way here in the book.)

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With the action query finished, the next statement — `DoCmd.SetWarnings True` — sets the warning messages back to their normal status.

Because code is building the SQL statement, the code can also make decisions about how to build the statement along the way. Thus, a VBA procedure could actually customize a SQL statement to a particular need or situation. In short, a procedure can make decisions about how to "write itself" before it executes itself. Funky but true.

Creating Tables from VBA

As you (hopefully) know, you can create tables in Access interactively, using Table Design. If you've ever created a Make-Table action query, you know you can build a new table from any existing table or query. VBA can also create new tables, either from existing tables and queries or from scratch.

Creating new tables from existing tables

The easiest way to use VBA to create a new table from an existing table is to first design a Make-Table query in Access. (In Query Design, choose Query➪ Make-Table Query from the Access menu bar, and then specify the name of the table to create. Refer to Figure 7-5.) Figure 7-7 shows an example of a Make-Table query that selects fields from a couple of related tables, where the `Paid` fields contain `False`. Although not readily apparent just by looking at the query, when run, this query actually creates a new table named `UnpaidOrdersSummaryTable`.

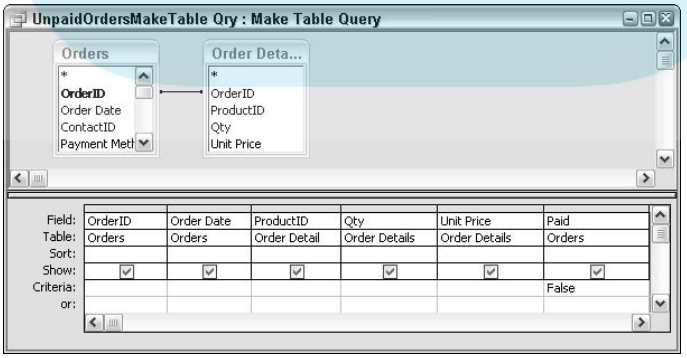

Figure 7-7: Sample Make-Table query.

Viewing the SQL statement for the Make-Table query shown in Figure 7-7 reveals the following SQL statement:

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```
SELECT Orders.OrderID, Orders.[Order Date], [Order Details].ProductID, [Order
                Details].Qty, [Order Details].[Unit Price], Orders.Paid
                INTO UnpaidOrdersSummaryTable FROM Orders INNER JOIN [Order
                Details] ON Orders.OrderID = [Order Details].OrderID WHERE
                (((Orders.Paid)=False));
```

Even in the SQL statement, the only indication that this is a Make-Table query are the words `INTO UnpaidOrdersSummaryTable`, which tell the query to store a copy of the records the query produces into a table named `UnpaidOrdersSummaryTable`.

When a Make-Table query executes, it will first check whether the destination table (`UnPaidOrdersSummaryTable`, in this example) exists. If that table does exist, the table will be deleted before the new table is created. If you want to add new records to an existing table, use an Append query rather than a Make-Table query.

Of course, the Make-Table query shown here is just an example. The technique for converting the Make-Table query to code would be the same for any query. It's simply a matter of copying the SQL statement to the Code window and tweaking the statement so it works in VBA. The following code shows how the Make-Table query shown in Figure 7-7 looks after being properly formatted to work in a VBA procedure:

```
'Declare a variable to store SQL statement.
Dim mySQL As String

'Build mySQL string from query's SQL statement.
mySQL = "SQLECT Orders.OrderID, Orders.[Order Date], [Order Details].ProductID,"
mySQL = mySQL + " [Order Details].Qty, [Order Details].[Unit Price],
              Orders.Paid"
mySQL = mySQL + " INTO UnpaidOrdersSummaryTable"
mySQL = mySQL + " FROM Orders INNER JOIN [Order Details]"
mySQL = mySQL + " On Orders.OrderID=[Order Details].OrderID"
mySQL = mySQL + " WHERE (((Orders.Paid)=False))"

'Now turn off warning and execute the SQL statement.
DoCmd.SetWarnings False
DoCmd.RunSQL mySQL
DoCmd.SetWarnings True
```

Creating a new, empty table from VBA

You can also create tables programmatically from VBA by using an SQL `CREATE TABLE` statement with the following syntax:

```
CREATE TABLE tableName (field type (size)) [, ...]"
```

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where

- *tableName* is the name of the table to create.
- *field* specifies the name of one field in the table.
- *type* specifies the data type of the field.
- *size* indicates the size of the field.
- ... indicates that you can repeat the field type (size) combination for each field you want to define in the table.

For example, the SQL statement below creates a new, empty table named `myTable` that contains a `Text` field named `ProductID` that's 5 characters wide and a field named `Vendors` that's 255 characters wide:

```
CREATE TABLE myTable ([ProductID] text (20), [VendorList] text (255))
```

To create that table from within a procedure, use `DoCmd.RunSQL` to execute the `CREATE TABLE` statement, as follows:

```
DoCmd.RunSQL "CREATE TABLE myTable ([ProductID] text (20), [VendorList] text
              (255))"
```

as one long line in your code. As always, if the SQL statement is lengthy, you can break it into chunks, as follows:

```
Dim mySQL As String
mySQL = "CREATE TABLE myTable"
mySQL = mySQL + " ([ProductID] text (20),"
mySQL = mySQL + " [VendorList] text (255))"

DoCmd.RunSQL mySQL
```

Closing and deleting tables through VBA

In some situations, you might want your VBA code to close a table if it's open, or even delete an entire table from the database. (You can't close an open object, so if you want to delete a table, you have to close it first.) As an example, suppose you want to write a procedure that checks whether a table named `myTable` already exists in the current database. If that table does already exist and is open, you want the procedure to close it. And finally, assuming that the table does exist, you want your code to delete the table.

You could write the procedure as follows. In your own code, replace the table name `myTable` with the name of the table you want to close and delete, but the rest of the code would work as it stands:

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```
'Look at each object in All Tables collection.
Dim obj As AccessObject
For Each obj In Application.CurrentData.AllTables
   'If the current table is named myTable...
   If obj.Name = "myTable" Then
      'and if MyTable is open (loaded)...
      If obj.IsLoaded Then
'...close myTable
         DoCmd.Close acTable, "myTable", acSaveNo
      End If

   'Now delete the closed myTable table.
   DoCmd.DeleteObject acTable, "myTable"
   End If
Next obj

'By the time execution gets here, the table named
'myTable no longer exists in the current database.
```

To close the open table, the code uses the `Close` method of the `DoCmd` object. To delete the table, the code uses the `DeleteObject` method of the `DoCmd` object. All the rest of the code is really about finding out whether the table already exists and is open to make sure that the code doesn't attempt to close an open or a nonexistent table. Those steps are necessary because if the code attempts to close an open or nonexistent table, the code will fail and throw an error message onscreen.

Adding Records to a Table

VBA can also *append* (add) records to any table that already exists in the database without deleting or changing any records that might already be in the table. If the records to be appended to the table already exist in some other table, you can use a simple append query (in Access) to generate the appropriate SQL statement.

For example, Figure 7-8 shows an append query that selects several fields and records from two related tables in a database. The name of the destination table, `PaidOrderSummary`, isn't visible in the query. You specify that after choosing Query➪Append Query from Access's menu bar. When you view the SQL statement for the query, you'll see the destination table's name there, as follows.

```
INSERT INTO PaidOrderSummary ( OrderID, [Order Date], ProductID, Qty, [Unit
            Price] ) SELECT Orders.OrderID, Orders.[Order Date], [Order
            Details].ProductID, [Order Details].Qty, [Order Details].[Unit
            Price] FROM Orders INNER JOIN [Order Details] ON Orders.OrderID =
            [Order Details].OrderID WHERE  (((Orders.Paid)=True));
```

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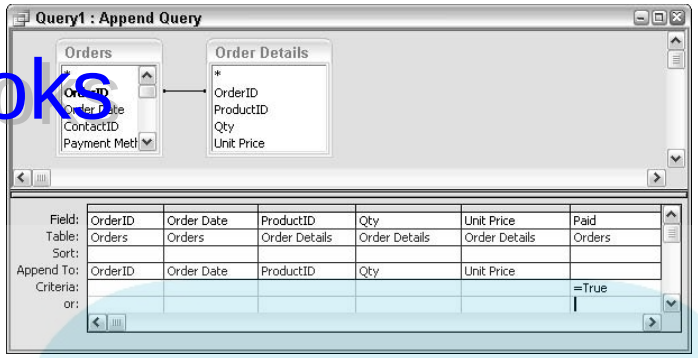

Figure 7-8: A sample append query in Access Query Design.

Because an append query is an action query, you can execute it by using `DoCmd.RunSQL` just as you can other action queries shown in this chapter. You can add the various portions of the lengthy SQL statement to a variable and then execute the statement in the variable, as follows:

```
'Declare a string variable named mySQL.
Dim mySQL As String

'Put a lengthy SQL statement into mySQL (in chunks).
mySQL = "INSERT INTO PaidOrderSummary"
mySQL = mySQL + " (OrderID, [Order Date], ProductID, Qty, [Unit Price] ) "
mySQL = mySQL + " SELECT Orders.OrderID, Orders.[Order Date], "
mySQL = mySQL + " [Order Details].ProductID, [Order Details].Qty,"
mySQL = mySQL + " [Order Details].[Unit Price]"
mySQL = mySQL + " FROM Orders INNER JOIN [Order Details]"
mySQL = mySQL + " ON Orders.OrderID = [Order Details].OrderID"
mySQL = mySQL + " WHERE (((Orders.Paid)=True))"

'Turn off warnings and append the records as specified in by SQL.
DoCmd.SetWarnings False
DoCmd.RunSQL mySQL
DoCmd.SetWarnings True
```

Appending a single record with SQL

You can also use the `SQL INSERT INTO` statement to add a single record to a table. However, the syntax is a little tricky as are the rules that determine how you do it. For example, you can't append an entirely blank record to a table that contains required fields because the table won't accept the record until all requirements have been met.

The basic syntax for inserting a single record into a table in SQL is

```
INSERT INTO tblName [(fldName [,...]) VALUES (value [,...])
```

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where

- *tblName* is the name of the table to which the record should be appended.
- *fldName* is the name of the field that will be assigned a value.
- *value* is the value you want to store in the field.
- [,...] means that you can list multiple fields and values, if you wish, as long as you separate their names with commas.

The order of values being assigned to fields must match the order of the field names in the statement. For example, suppose the database contains a table named Stats that contains a Date/Time field named Submitted, a Yes/No field named Paid, and a Text field named Status (among other fields). The following SQL statement adds one record to that table, placing the current date in the Submitted field, False in the Paid field, and No Reply in the Status field:

```
INSERT INTO Stats ( Submitted, Paid, Status ) VALUES (Date(), False, 'No Reply')
```

To execute the statement from VBA, just put the whole SQL statement in quotation marks next to a DoCmd.RunSQL statement, as usual. Or you can build it from shorter lines, as follows:

```
Dim mySQL As String
mySQL = "INSERT INTO Stats ( Submitted, Paid, Status )"
mySQL = mySQL + " VALUES (Date(), False, 'No Reply')"
DoCmd.RunSQL mySQL
```

Query to append one record

You can actually create a query that appends a single record to a table, but the way you create the query is a little weird. The resulting SQL statement doesn't exactly match the syntax that I described earlier, either. But it all works and would definitely be easier than trying to write a lengthy SQL statement by hand.

The trick is to create a new query that doesn't have any tables up top. Or if there is a table at the top of the query, right-click it and choose Delete so that there are no tables up top. Then choose Query➪Append Query to change the query to an append query and specify the name of the table into which the query should append its record.

In the Field row of the QBE grid, you need to provide a value for at least one field in the table. The syntax will be *name*:*value*, where *name* could be any name, and *value* is the value that you want to store in a field. Then, in the Append To row, choose the field into which you want to place the value. For

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example, the query in Figure 7-9 will append a single record with the current date in the `Submitted` field, `False` in the `Paid` field, and `No Reply` in the `Status` field. The figure also shows the SQL statement for the query.

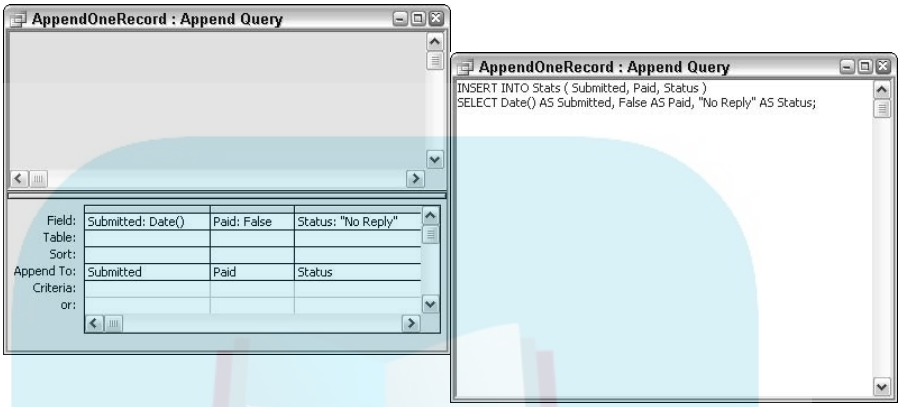

Figure 7-9: Sample append query and its SQL view.

Even though the syntax of the SQL statement for the query doesn't look like the syntax that I describe earlier, the statement will execute just fine in VBA. Here's how you could write the code to execute that statement (and temporarily turn off warning messages):

```
Dim mySQL As String
mySQL = "INSERT INTO Stats ( Submitted, Paid, Status )"
mySQL = mySQL + " SELECT Date() AS Submitted, False AS Paid,"
mySQL = mySQL + " 'No Reply' AS Status"
'Note single quotation marks inside double quotation marks above.

DoCmd.SetWarnings False
DoCmd.RunSQL mySQL
DoCmd.SetWarnings True
```

Changing and Deleting Table Records

Any Access update query or delete query will also convert nicely to VBA. For example, suppose you keep track of which new customers you've sent e-mail to by using a `Yes/No` field named `SentWelcome` in a table. Customers who have been sent the message have `True` in that field; customers who haven't been sent the message have `False` in that field. For the sake of example, say that this table also has a field named `Email` that's either the `Text` or `Hyperlink` data type that contains each customer's e-mail address.

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Now suppose you want to write some code that automatically changes the contents of the `SentWelcome` field to `True` for all AOL customers. You create an update query that includes the `SentWelcome` field and set its `Update To` row to `True` to change the contents of that field to `True`. Then you also need a criterion to prevent the change from occurring in all records. In this case, where you want to update only records that have `@aol.com` in the `Email` address field, the criterion expression would be `InStr([Email],'@aol.com')>0`. The entire update query would look like Figure 7-10. (Because it's a small query, I managed to fit both the Query Design and SQL views of the query into one figure.)

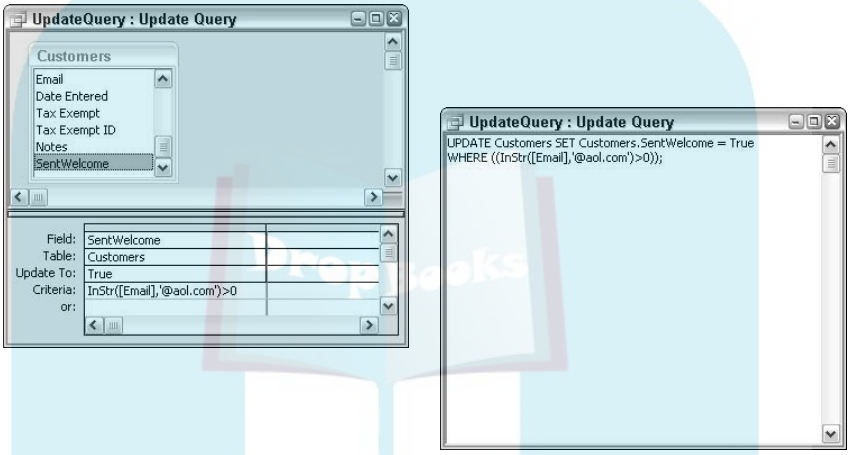

Figure 7-10: A sample update query (two views).

Don't experiment with a delete query or an update query against a table that contains data that you can't afford to lose or ruin. Your best bet would be to work in a copy of your database so that you don't have to worry about losing any important information.

By using the standard method of getting a SQL statement into a variable and executed from VBA, the code that's needed to turn off warnings, do the update, and turn warnings back on looks like this:

```
'Build SQL statement into string variable named mySQL.
Dim mySQL As String
mySQL = "UPDATE Customers"
mySQL = mySQL + " SET Customers.SentWelcome = True"
mySQL = mySQL + " WHERE (InStr([Email],'@aol.com')>0)"

'Hide warning and do the update.
DoCmd.SetWarnings False
DoCmd.RunSQL mySQL
DoCmd.SetWarnings True
```

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If you want your code to delete records from a table, just create a delete query that specifies the records to be deleted and put its SQL statement into VBA code. For example, Figure 7-11 shows an Access delete query in both Query Design view and SQL view. That particular query deletes all records from a table named `PaidOrderSummary`.

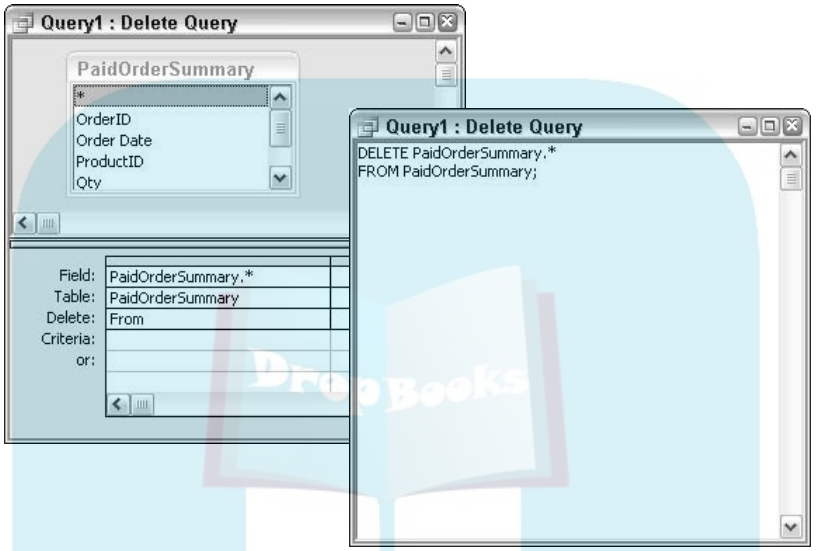

Figure 7-11: A sample delete query.

As with any action query, to get the SQL statement to execute from VBA and delete all records from the table, you need to execute the SQL statement with `DoCmd.RunSQL`. Because this particular SQL statement is so short, there's no need to store it in a variable in chunks. The following statement is sufficient:

```
DoCmd.RunSQL "DELETE PaidOrderSummary.* FROM PaidOrderSummary"
```

Doing an Action Query on One Record

No rule says that an action query must work on multiple records in a table. Any action query can perform its task on just one record in the table, provided that there's a way to uniquely identify the record. If the table has a primary key, isolating a record by a value in that field is simple.

For example, suppose that you have a table named `Customers` that contains an `AutoNumber` field named `CustID` that acts as the primary key. You can easily isolate any customer in the table by using the customer's `CustID` value as the `Criteria` entry for the `CustID` field. Figure 7-12 shows a delete query that

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uses such a criterion to delete only Customer #14 from the `Customers` table. The SQL statement reflects the criterion that the `CustID` field equals `14` by the addition of `WHERE (((Customers.CustID)=14))` to the SQL statement.

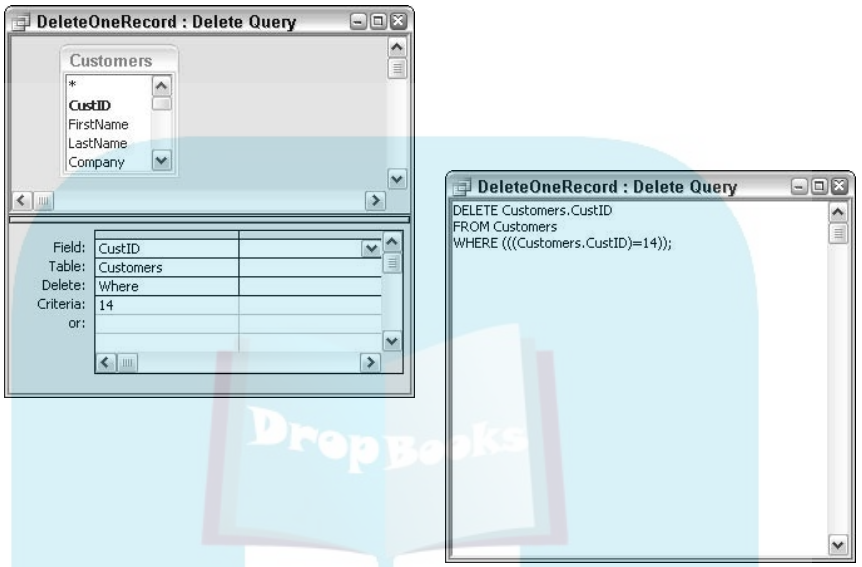

Figure 7-12: Sample query to delete one record.

All the parentheses in that `WHERE` clause aren't really necessary, nor is the table name `Customers`. The `WHERE` clause could be written more simply as `WHERE CustID=14` or with the field name in square brackets, as in `WHERE [CustID]=14`.

Working with Select Queries and Recordsets

So far in this chapter, I've focused mainly on Access action queries that you execute from VBA by using `DoCmd.RunSQL`. Select queries, which only display data (and never change the contents of a table), are a completely different story. In Access, you don't run a select query. You simply switch from Query Design view to Datasheet view to see the records returned by that query. And in VBA, you don't use `DoCmd.RunSQL` to execute a select query. Rather, you store the results of the query in a weird, invisible thing called a *recordset*.

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When you click Queries in the Access database window, icons for saved action queries will generally include an exclamation point (!), and icons for saved select queries have no exclamation point.

Look at an example, starting in Access. The left side of Figure 7-13 shows a fairly simple select query (in Query Design) that will display the fields named `FirstName`, `LastName`, and `Email` from a table named `Customers`. The weird-looking criteria expression, `InStr([Email],'@aol.com')>"1"`, limits the display to those records that have the characters `@aol.com` somewhere in the e-mail address. Switching that query to Datasheet view shows the query results, as in the lower right half of that same figure.

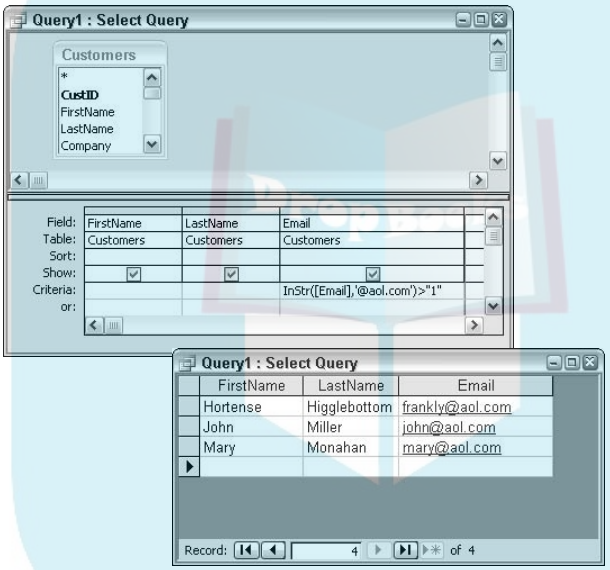

Figure 7-13: Simple select query and its datasheet results.

In VBA, that Datasheet view of the query shows exactly what a recordset that uses the same SQL statement of the query will produce. As with any query, you can easily view (and copy) a select query's SQL statement by right-clicking the query's title bar and choosing SQL View. However, unlike the Datasheet view of a query, which is plainly visible onscreen, a recordset will be visible only to VBA, not to humans.

Creating a recordset in VBA usually takes several lines of code. As always, there are a ton of options for how you write the code. In general, the syntax of statements that you need to create a recordset from one or more tables in the current database is as follows:

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```
Dim cnnX As ADODB.Connection
Set cnnX = CurrentProject.Connection
Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnnX

myRecordSet.Open SQLstatement
```

where

- *cnn* is a variable name of your choosing that defines the connection.
- *myRecordSet* is the name that you want to give to your recordset. (You'll use whatever name you put here to refer to the recordset from elsewhere in the procedure.)
- *SQLstatement* is a valid SQL statement that isn't an action query (for example, the SQL from any select query's SQL view, or the name of a table in the current database).

Start with a simple example. Suppose that you want to create a recordset named `myRecordSet` that contained all the fields and records from a table named `Customers`. In that case, you wouldn't need SQL at all because using the table name in the `myRecordSet.Open` statement is sufficient, as follows:

```
Dim cnn1 As ADODB.Connection
Set cnn1 = CurrentProject.Connection
Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnn1

myRecordSet.Open "[Customers]"
```

If you want the recordset to contain only some fields and/or records from the `Customers` table, use a valid SQL statement in place of the whole table name. For example, the SQL statement `SELECT FirstName, LastName FROM Customers` creates a recordset that contains only the `FirstName` and `LastName` fields from the `Customers` table. Using that SQL statement in place of the table name in the code looks like this:

```
Dim cnn1 As ADODB.Connection
Set cnn1 = CurrentProject.Connection
Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnn1

myRecordSet.Open "SELECT FirstName, LastName FROM Customers"
```

Like with action queries, the SQL statement for a select query can be very long. To prevent super-wide lines in your code, you can store the SQL statement in a variable in chunks. Then use the variable name in place of a table name or SQL statement in the `myRecordSet.Open` statement. For example, the following SQL statement is from a query that shows the `CustID`,

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FirstName, LastName, and Email fields from a table named Customers but only for records where the Email address field is currently empty (or *null* in programmer lingo):

```
SELECT Customers.CustID, Customers.FirstName,
          Customers.LastName, Customers.Email
FROM Customers
WHERE (((Customers.Email) Is Null));
```

To use that SQL statement in VBA, you could write the code as follows:

```
Dim cnn1 As ADODB.Connection
Set cnn1 = CurrentProject.Connection
Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnn1

'We'll put lengthy SQL statement in variable named mySQL.
Dim mySQL As String
mySQL = "SELECT Customers.CustID, Customers.FirstName,"
mySQL = mySQL + " Customers.LastName, Customers.Email"
mySQL = mySQL + " FROM Customers"
mySQL = mySQL + " WHERE (((Customers.Email) Is Null))"

'Now we use mySQL variable name in statement below.
myRecordSet.Open mySQL
```

I suppose that anyway you slice it, the code needed to create a recordset is just plain ugly and intimidating. All those Dim and Set statements at the top of each example shown so far in this section need to be executed before the recordset is created with the .Open method. You wouldn't have to use those *exact* lines: They're just the standard lines that you use to build a recordset from a table or query in the current database. However, you do have to define a connection and name for a recordset before you can open it.

Defining a connection

Although invisible to a human, a recordset is an actual object that VBA can manipulate. You can think of a recordset as sort of an invisible, ghost image of a datasheet that invisible VBA can manipulate (at lightning speeds, I might add). But before VBA can even create such a ghost, it needs to know where the actual tables for the ghost reside. And that's where the first two statements, shown as follows, come in:

```
Dim cnn1 As ADODB.Connection
Set cnn1 = CurrentProject.Connection
```

The first line declares to all VBA statements to all lines of code that follow that it is creating a thing named cnn1 that will be an ADODB connection.

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ADO, which stands for ActiveX Data Objects, is the object model I'll be using to create recordsets throughout this book. ADO isn't built into Access: It's actually an object library that many programs can use to manipulate data in Access tables. For example, you could write VBA code in a Microsoft Excel or Word macro to grab data out of an Access table, provided that you use ADO.

To use ADO in VBA, you need to set a reference to Microsoft ActiveX Data Object Library in References. Like all object libraries, ADO is a highly organized collection of objects, properties, and methods that you can boss around with VBA to make databases do things. And like all other things you can manipulate with VBA, you'll find ADO objects, properties, and methods in the Object Browser and also in VBA's Help.

So, what the heck does `Dim cnn1 As ADODB.Connection` mean? Well, the `Dim` statement is declaring to the rest of the code that *From this point on in this procedure, the name* cnn1 *shall refer to an ActiveX Data Objects Database connection.* The part is just a name I made up, like a `c=variable` name. It could be any valid variable name, including `X`, `myConnection`, `Connection01` . . . whatever you want it to be.

The next line of code, `Set cnn1 = CurrentProject.Connection`, gets more specific about what `cnn1` is all about. It says, *More specifically, cnn1 is the connection to that data in the database I'm currently working on.* Both lines are required because there are lots of other things to which you can set a connection (none of which is particularly relevant to this book, though).

Defining the recordset and data source

Referring to most of the previous recordset examples, the second two lines of code declare what the recordset is and from where it gets its data, as follows:

```
Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnn1
```

The first line declares to all the code that follows (within the current procedure) that the name `myRecordSet` will, from here on out, refer to an ActiveX Data Objects Database recordset. That tells the rest of the code a lot about what `myRecordSet` is, but it doesn't say anything about where this `myRecordSet` thing is going to find data from which it can create recordsets. The next line of code, `myRecordSet.ActiveConnection = cnn1`, takes care of that problem though by setting the `myRecordSet` active connection to that connection I already defined as `cnn1`.

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Boring, ignorable stuff about DAO and DBEngine

Originally, Access offered only one way to create a recordset: DAO (for Data Access Objects). DAO used different words like `DBEngine` and `WorkSpace` to create recordsets. You might still see that in older code examples (but not in this book). In this book, I use the new-and-improved ADO (ActiveX Data Objects) technology to create and manipulate recordsets.

As a technology, DAO has been demoted to a *maintenance mode* technology, which means that Microsoft isn't going to be making any future improvements to the technology. If DAO were a living organism, *maintenance mode* would translate to *somewhere between doomed and dead.*

Filling the recordset with data

With the VBA statements that define a connection and name for the recordset out of the way, you can finally write the code that actually adds data to the table. That's where the `.Open` method comes into play. In all the earlier examples, I used a relatively simple statement to fill the recordset. The full syntax for creating an ADO recordset looks like this:

```
myRecordSet.Open SQLStatement [,Connection] [,CursorType] [,LockType]
```

All the arguments after SQL statements are optional, so that's why you didn't see them used in any of the preceding `myRecordSet.Open` statements in this chapter. Chances are that if you omit those arguments in your own `myRecordSet.Open` statements, your recordsets will work just fine, too. Just so you know that there are other options available, which can be particularly useful when modifying code written by other people. Here's what each of the optional arguments allows you to specify:

- *`Connection`* is the connection (not required if you already defined the connection by using `myRecordSet.ActiveConnection` in code already).
- *`CursorType`* defines how VBA can access records in the recordset, and how simultaneous changes to the recordsets underlying data will affect the contents of the recordset by using any of the following constants:
  - `adOpenDynamic`: Code can freely move the cursor through the records. Other users' additions, changes, and deletions carry over to the recordset.
  - `adOpenKeyset`: Code can freely move the cursor through the records. Other users' additions, changes, and deletions do not carry over to the recordset.

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- `adOpenStatic`: The recordset contains a snapshot of data that's no longer connected to the live data in any way, so other user's changes to the underlying table or query have no effect on the recordset. VBA can move the cursor freely through the recordset.
- `adOpenForwardOnly`: Cursor can scroll down through records only; additions, changes, and deletions from other users are ignored. This is preferred when VBA just needs quick brief access to a table to search for something or to count things (and also the default setting if you don't include this argument in your `.Open` statement).

- *`LockType`*: Determines how other users' simultaneous changes to the table or query are handled. The more commonly used constant names and lock types are listed here:
  - `adLockOptimistic`: Indicates *optimistic locking,* where records are locked only when you call the `.Update` method in your VBA code.
  - `adLockPessimistic`: Indicates *pessimistic locking,* where records are locked automatically after a change (without calling the `.Update` method).
  - `adLockReadOnly`: Indicates read-only records, whereby no changes at all are allowed to data in the recordset (default setting if omitted).

As an example of using a couple argument in a recordset's `.Open` method, the following code creates a forward-only, read-only recordset that gets its records from a table named `Customers`:

```
Dim myRecordSet As New ADODB.Recordset

 myRecordSet.Open "[Customers]", CurrentProject.Connection, adOpenForwardOnly,
                adLockReadOnly
```

The syntax for ADO recordsets also allows you to specify optional arguments individually, using the syntax `recordSetName.`*`property = value`*. For example, the following lines create a recordset that connects to the current database (`CurrentProject.CurrentConnection`), sets the cursor type to `adOpenDynamic`, and sets the `LockType` to `adLockOptimistic`:

```
'Set up the connection, name it cnn1.
Dim cnn1 As ADODB.Connection
Set cnn1 = CurrentProject.Connection

'Define a new recordset and pre-define optional arguments.
Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnn1
myRecordSet.CursorType = adOpenDynamic
myRecordSet.LockType = adLockOptimistic

'Fill recordset with data from Customers table
myRecordSet.Open "SELECT * FROM Customers"
```

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Methods for managing recordsets

After a recordset's `.Open` method has been executed, the recordset will contain the fields and records specified by the table or SQL statement in the `.Open` statement. You won't see this recordset anywhere onscreen, but your VBA code will be able to see and move through the records in the recordset.

For example, assuming that the current database contains a table named `Customers` — which in turn contains fields named `LastName`, `FirstName`, and `Email` (among other fields) — the following statements create a recordset of records from that table that have `@aol.com` in the `Email` field.

```
Dim cnn1 As ADODB.Connection
Set cnn1 = CurrentProject.Connection

Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnn1

'Store the SQL statement in a variable.
Dim mySQL As String
mySQL = "SELECT FirstName, LastName, Email"
mySQL = mySQL + " FROM Customers"
mySQL = mySQL + " WHERE ((InStr([Email],'@aol.com')>1))"

myRecordSet.Open mySQL
```

Assume that the table named `Customers` contains four records that have `@aol.com` in the recordset. The invisible recordset named `myRecordSet` that's created in the above code would look something like Figure 7-14 (if you could see it).

FirstName	LastName	Email
Hortense	Higglebottom	frankly@aol.com
John	Miller	john@aol.com
Mary	Monahan	mary@aol.com

Figure 7-14: What a recordset would look like if you could see it.

After the recordset exists in code, you can use numerous methods of the ADODB recordsets to move the cursor through the recordset. (Like the recordset itself, the cursor is invisible, but VBA can still move that invisible cursor into any record in the recordset.) The syntax is generally *`myRecordSet.method`* where *`myRecordSet`* is the name of the recordset on which the method should be performed followed by a dot (`.`) and a valid method.

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The cursor type of the recordset puts severe restrictions on which methods you can use. For maximum flexibility, use the `AdOpenDynamic` cursor type option described earlier in this chapter.

- *myRecordSet*`.MoveFirst`: Moves the cursor to the first record in the recordset.
- *myRecordSet*`.MoveNext`: Moves the cursor to the next record in the recordset.
- *myRecordSet*`.MovePrevious`: Moves the cursor to the previous record in the recordset.
- *myRecordSet*`.MoveLast`: Moves the cursor to the last record in the recordset.

In addition to the preceding methods, you can use the `BOF` (Beginning of File) and `EOF` (End of File) properties to determine whether the cursor is currently pointing at a specific record. For example, the following statement returns `True` only if the cursor is sitting above the first record in the recordset:

```
myRecordSet.BOF
```

The following statement returns `True` only if the cursor is already past the last record in the set (pointing at nothing):

```
myRecordSet.EOF
```

You'll often see these properties used in code that loops through records in a set one record at a time. For now, it's sufficient to know that the properties exist. Take a look next at how you can refer to fields in a record from VBA.

Referring to fields in a recordset

The columns (fields) in a recordset all have names, just as they do in tables. However, in VBA, each record is also a collection of fields, with the first (left-most) field being numbered 0, the next being 1, the next being 2, and so forth. The full reference to a field by its number is *myRecordSet*`.Fields(`*x*`)` where *x* is a number. For example, VBA can refer to the columns in the recordset named `myRecordSet` as `myRecordSet.Fields(0)`, `myRecordSet.Fields(1)`, and `myRecordSet.Fields(2)`, as illustrated in Figure 7-15.

Each field has properties and methods, too — for example, the `Name` property. When used as follows, it returns the name of the field at that position:

```
myRecordSet.Fields(0).Name
```

The `Value` property of a field, when used as follows, returns the field's contents:

```
myRecordSet.Fields(0).Value
```

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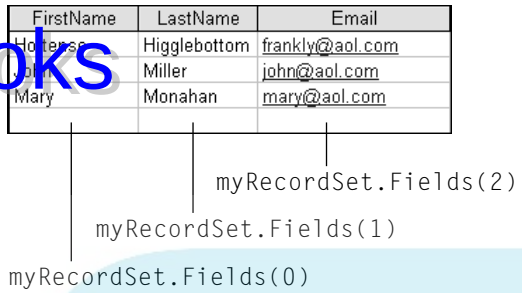

Figure 7-15: Referring to recordset fields by position.

You can refer to a field in a recordset by its name rather than by its number. To refer to a field by its name, replace the number in the preceding syntax with the name of the field enclosed in quotation marks. For example, the following statement below returns the value of the field named `Email` in the current record in the recordset:

```
myRecordSet.Fields("Email").Value
```

Closing RecordSets and collections

To close an open recordset, use the `Close` method with the recordset name. For example, to close an open recordset named `myRecordSet`, use the statement

```
myRecordSet.Close
```

The preceding statement closes the recordset only in terms of being able to manipulate its data from VBA. The recordset and its connection, which you originally defined by using `Dim` and `Set` statements, should be closed out, too. Any time you use a `Set` keyword to define something, you can undefine that something by setting it to the keyword `Nothing`. For example, the following statements close the connection between `myRecordSet` and the `cnn1` connection, and then get rid of the `cnn1` connection altogether:

```
Set myRecordSet = Nothing
Set cnn1 = Nothing
```

Recordsets are not the easiest things in the world to create and manipulate. Fortunately, you can often avoid creating and using recordsets to get a job done just by creating an action query to perform the job and executing the query's SQL statement by using `DoCmd.RunSQL`.

But when an action query just won't cut it, you can always fall back on creating and manipulating table data through a recordset. You'll see a practical example of using recordsets in the next chapter.

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Chapter 8

Putting Recordsets to Work

In This Chapter

- More working with objects and collections
- General tips for reading and modifying existing code
- Creating a procedure to skip over used mailing labels
- Typing a `Sub` procedure to a form event

In this chapter, you'll put to work many of the concepts and techniques from earlier chapters by creating a custom procedure named `SkipLabels()`. This procedure is handy for anyone who prints mailing labels on individual label sheets by printing on sheets that are missing some labels.

Before you get into writing `SkipLabels()`, though, you need to know a few more general techniques. In particular, you need to discover what programmers call *looping through collections* or *enumerating,* for short. You'll also look at some general info on reading and modifying existing code.

Looping through Collections

As I mention in Chapter 5, Access contains objects and collections whose properties and methods can be controlled through VBA. Each collection has a specific name. For example, the `CurrentProject.AllForms` collection contains the names of every form in the current database.

Every collection has a `.Count` property that describes how many objects are currently in the collection. For example, `CurrentProject.AllForms.Count` represents the number of forms in the current database. For example, if you type **? CurrentProject.AllForms.Count** into the VBA editor's Immediate window and press Enter, you'll see the number of forms contained within the database.

Objects within a collection are always *enumerated* (numbered), starting with 0 (zero). For example, the first item in the `AllForms` collection is `AllForms(0)` (pronounced *all forms sub zero*). The second item in the `AllForms` collection is `AllForms(1)`. The next is `AllForms(2)`, and so on, as illustrated in Figure 8-1.

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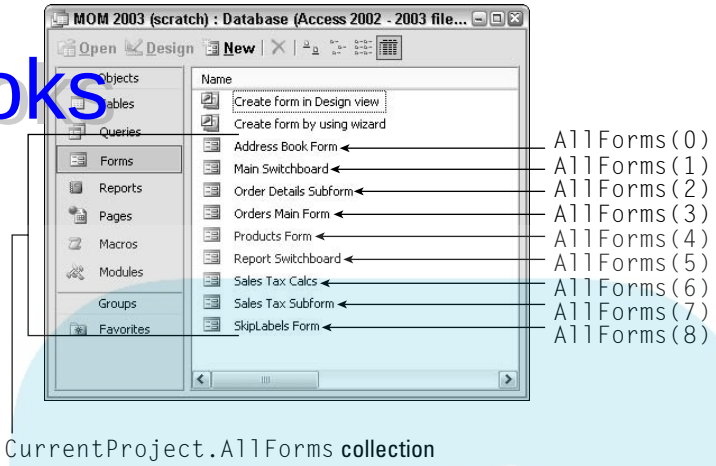

Figure 8-1: `CurrentProject.AllForms` collection and members.

As discussed in Chapter 5, an object can also be a collection. That is, it can be both an object and a collection at the same time. For example, a form is an object, but a form is also a collection of controls. From VBA (or an Access expression), you refer to an open form's `Controls` collection by using the syntax

```
Forms!("formName").Controls
```

where *formName* is the name of an open form. As with any collection, the controls in a form are enumerated (numbered starting with zero). For example, the first control on a form is *formName*`.Controls(0)`, the next is *formName*`.Controls(1)`, and so forth. Figure 8-2 shows an example using a form named `MyForm` that contains nine controls numbered 0–8.

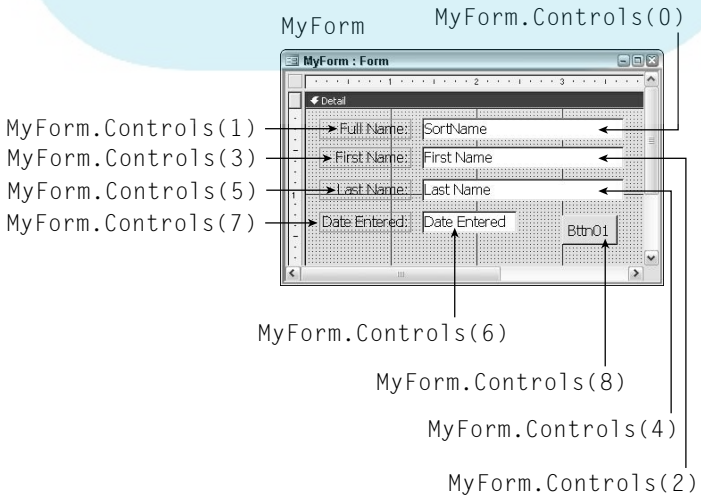

Figure 8-2: A form as a collection of controls.

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Using For Each loops

The specific number assigned to each item in a collection isn't terribly important. What is important is the fact that VBA provides some special commands for looping through a collection (also called *enumerating a collection*), where the code looks at each object in a collection either to get information about it or to change it. The special code is a slight variation on the `For...Next` loop called a `For Each...Next` loop. The basic syntax for the `For Each...Next` loop is

```
For Each objectType in collectionName
   '...code to be performed on each object
Next
```

where *objectType* is one of the object type names listed in the second column of Table 8-1, and *collectionName* is the name of a collection from the third column in that same table. Note that some collections are actually specific objects as well. For example, in Table 8-1, *formName* needs to be replaced with the name of an open form, and *ctrlName* needs to be replaced with the name of a specific control on an open form.

Table 8-1 Object Types and Collection Names for For Each... Next Loops

Object	*Object Type*	*Collection Name*
Table	`AccessObject`	`CurrentData.AllTables`
Query	`AccessObject`	`CurrentData.AllQueries`
Form	`AccessObject`	`CurrentProject.AllForms`
Report	`AccessObject`	`CurrentProject.AllReports`
Open form	`Form`	`Application.Forms` (Open forms)
Open report	`Report`	`Application.Reports` (Open reports)
Control	`Control`	`Forms!("formName").Controls`
Property	`Property`	`Forms![formName]![ctrlName].Properties`
Recordset field	`ADODB.Field`	*recordsetName*`.Fields`

The `Forms` collection refers to all forms that are currently open. The `AllForms` collection refers to all forms in the current database, whether they're open or not.

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For example, here's a `For Each...Next` loop that looks at each object in the `Forms` collection.

```
For Each AccessObject in CurrentProject.AllForms
    '...code to act on each form goes here
Next
```

Here's a `For Each...Next` loop that looks at each control on an open form named `MyForm`:

```
 For Each Control in Forms!MyForm.Controls
   '...code to act on each control goes here
Next
```

Look at an example you can actually try out. You'll want to open some database that already contains some tables and forms to try this out. Within that database, click the Modules button in the database window and then click New to create a new, empty module. Now you're in the VBA editor.

From the menu bar in the VBA editor, choose Insert➪Procedure. In the Add Procedure dialog box that opens, type some simple name (like **test**), choose Sub as the function procedure type, and click OK. You see the lines `Public Sub test()` and `End Sub` in the Code window.

With the procedure, type some code to test. For example, you could type the following `For Each` loop to try out looping through the `AllForms` collection:

```
    For Each AccessObject In CurrentProject.AllForms
       Debug.Print AccessObject.Name
    Next
```

When executed, the `For Each...Next` loop will repeat once for each form that's contained within the current database. Within the loop, the `Debug.Print` statement just prints the name of the current object in the collection (using its `Name` property).

As you can read in Chapter 12, `Debug.Print` is often used as a debugging tool. Here, you use `Debug.Print` just to see the name of each object that the `For Each...Next` loop encounters.

Any time that you add a `Sub` procedure to a module, you can test it out just by typing its name (without the following parentheses). In this case, the procedure is named `test`. So after you get the whole procedure typed into the Code window, as in the top of Figure 8-3, you can type **test** into the Immediate window and press Enter. That causes the code to run. With each pass through the loop, the code prints the name of the next form in the database. For example, Figure 8-3 shows the results of running the test procedure in one of my databases.

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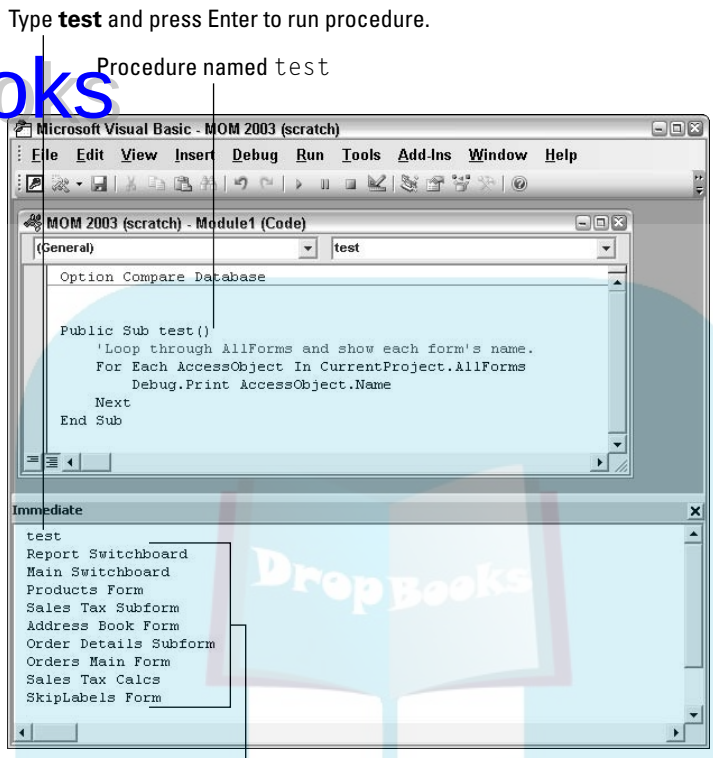

Figure 8-3: Testing some code in the Immediate window.

If you change the name `CurrentProject.AllForms` to `CurrentData.AllTables` in the test procedure shown in Figure 8-3 and then run the procedure again, the code lists the name of every table in the current database. Likewise, changing `CurrentData.AllTables` to `CurrentData.AllQueries` lists all the queries in the current database.

Assume now that you want to create a `For Each` loop that looks at each control on an open form named `Products Form`. (This code works only in a database that has a form named `Product Form` and when that form is open.) In this case, `Forms![Products Form].Controls` is the name of the collection, and each object in the collection is a control. Thus, a `For Each` loop to display the name of each control in the Immediate window looks like this:

```
For Each Control In Forms![Products Form].Controls
   Debug.Print Control.Name
Next
```

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All objects in Access have a `.Name` property that returns the name of that particular object. All collections have a `.Count` property that reflects the number of items in the collection.

Using shorter names for objects

When you look at code written by other people, you'll often see a slight variation on the `For Each` loop where programmers use `Dim` statements to assign an object to some short variable name. Then they use that short name in the `For Each` loop. This helps prevent big, long lines of code that are hard to read.

Even though you use a `Dim` statement to create a short name, you don't assign a data type to the variable. Rather, you assign an object type. For example, each of the following `Dim` statements is perfectly valid. The comment after each `Dim` statement describes what that `Dim` statement declares:

```
Dim myObject As AccessObject   'MyObject is placeholder for any object
Dim myForm As Form             'MyForm is a placeholder for any form
Dim myReport As Report         'MyReport is a placeholder for any report
Dim myControl As Control       'MyControl is a placeholder for any control
Dim MyProp As Property         'MyProp is a placeholder for any property
```

Each `Dim` statement in the preceding is actually declaring what is called an *object variable*. The difference between a regular variable and an object variable is that a regular variable just stores some number or text in a cubbyhole. An object variable refers to an entire object. The syntax for assigning an object to an object variable is

```
Set name = object
```

For example, the following lines of code declare the short name `Ctrl` as a placeholder for any control object and the short name `Frm` as a placeholder for any form. The `Set` statement then assigns the open form named `Products Form` to the `Frm` object variable name:

```
Dim Ctrl As Control
Dim Frm As Form
Set Frm = Forms![Products Form]
```

In a loop that looks at each control of the form, you can use the short name `Ctrl` where you would have used the full word `Control`. And you can use `Frm` where otherwise you would have had to type **Forms![Products Form]**, as follows:

```
For Each Ctrl In Frm.Controls
    Debug.Print Ctrl.Name
Next
```

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Look at another example. Suppose that you have an open form named `Products Form`, and on that form is a control named `Selling Price`. Remember that every control has its own unique set of properties. To create a `For Each` loop that lists the name of every property for the `Selling Price` control on `Products Form`, you could use this syntax:

```
For Each Property In Forms![Products Form].[Selling Price].Properties
   Debug.Print Property.Name
Next
```

or you could write the code as follows. The end result is the same either way — the name of each property for the control named `Selling Price` appears in the Immediate window:

```
Dim ctrl As Control
Dim prp As Property
Set ctrl = Forms![Products Form].[Selling Price]
For Each prp In ctrl.Properties
   Debug.Print prp.Name
Next
```

In real life, you wouldn't create such loops just to have them print out names of objects in the Debug window. More likely, you'll do other types of operations on objects in a collection. You can place as many statements as you wish between the `For Each` and `Next` statements. Any code between those statements is executed once for each object in the collection, just like the `Debug.Print` statement is executed once for every object in each preceding collection example.

One of the main reasons why I even mention all this business with `For Each` loops and `Dim` statements is because when you try to modify existing code, you're likely to come across many situations where the programmer uses a `For Each` loop to look at each object in a collection. While I'm on the topic of reading other peoples' code, look at some more VBA rules and how you can use those rules to make more sense of any VBA code that you ever choose to read or modify.

Tips on Reading and Modifying Code

Many programmers start their careers by trying to modify existing code rather than trying to write their own code from scratch. Before you can modify existing code to suit your purposes, though, you need to be able to read and understand what the existing code is doing.

When you're viewing existing code in the Code window, it's easy to get help with any keyword in that code. Just select (double-click) the keyword with which you need help. Then press Help (F1). However, not every single word in

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VBA code is a VBA keyword. For example, variables' names and field names — which you make up on your own — aren't part of the VBA language, so you can't get any help with those in the VBA editor. For example, in the statement

```
Dim X As String
```

`X` is just a made-up variable name, not a keyword that's built into VBA. You could, though, select either the `Dim` or `String` term and press Help to get help with either of those keywords.

Square brackets represent names

The rules for referring to field names in VBA are the same rules used in Access expressions. When referring to a field name that contains blank spaces, you must enclose the field name in square brackets, like this: `[Sales Tax Rate]`. If the field name contains no blank spaces, the square brackets are optional. For example, the name `SalesTaxRates` in VBA refers to a field named `SalesTaxRates`, even without the square brackets.

Many programmers put square brackets around all field names for a couple of reasons. For one, it's a good habit to get into so that you don't forget to use the square brackets when you need them. Secondly, the square brackets visually identify which parts of a statement are names, thus making it easier to read the code. For example, you can tell that `SalesTaxRate` and `State` are names of things just by looking at the following.

```
 If [State]="CA" Then
   [SalesTaxRate] = 0.0775
Else
   [SalesTaxRate] = 0
End If
```

The square brackets around names apply to form names and object names, too. For example, in the following statement, `Products Form` is the name of a form, and `Selling Price` is the name of a field on that form. Both names are enclosed in square brackets because each name contains a blank space:

```
Forms![Products Form].[Selling Price]
```

Some programmers put square brackets around every part of an identifier, even parts of the name that don't require square brackets. For example, neither the following form name nor field name contains a space — neither does the word `Forms`. But because square brackets are optional when there's no space in the name, you can include them or not. Because none of the following hypothetical names contain a space, either version of the statement is perfectly okay (provided that there really is an open form named `ProdForm` that contains a control named `SellPrice` in the current database):

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```
[Forms]![ProdForm].[SellPrice]

Forms!ProdForm.SellPrice
```

Use the exclamation point (`!`), also called a *bang character* by programmers, to separate object names in an identifier. For example, `Me!MyCombo` refers to the object named `MyCombo` on the current form. Use the period to precede a property or method name, such as `Controls.Count`. For more information, search the Access Help (not VBA's Help) for *identifier*.

Other ways to refer to objects

You don't always have to refer to an object by its specific name. You can use some special names in code to refer to objects in Access, as follows:

- `Me`: In a class module, the term `Me` refers to the form to which the class module is attached. For example, `Me![Selling Price]` is short for *The control named Selling Price on the form to which this code is attached.*
- `CodeContextObject`: This refers to the name of the object in which the code is running. (In a class module, this is always the same as the form to which the class module is attached.)
- `Screen.ActiveControl`: This refers to whatever control has the focus right now.

Each of the preceding names supports a `Name` property, which you can use to determine the name of the control. For example, take a look at the sample form named `MyForm` in Figure 8-4. Note the names of the controls on the form.

The class module shown in Figure 8-4 is the class module for that tiny `MyForm` form in the same figure. Note the use of various names in the code. Here's what each of those names returns when the module is run:

- `Me.Name`: Displays `MyForm` because `MyForm` is the name of the form to which the module is attached.
- `Me.Controls.Count`: Displays `3` because there are three controls on `MyForm` — the `MyCombo` label, the `MyCombo` combo box, and the `MyBttn` button. Note that `Me.Controls` refers to the current form's `Controls` collection. The `.Count` property returns the number of items in the collection.
- `Me!MyCombo.Value`: Displays `Artichoke`, which is the value of the control named `MyCombo` on the current form.
- `CodeContext.Name`: Returns `MyForm` in this example because the class module always runs within the context of the current form, whose name in this case is `MyForm`.

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- `Screen.ActiveControl.Name`: When executed in this example, returns `MyBttn` because the user clicks `MyBttn` to execute the code. However, `Screen.ActiveControl` actually refers to whichever form on whichever control currently has the focus.

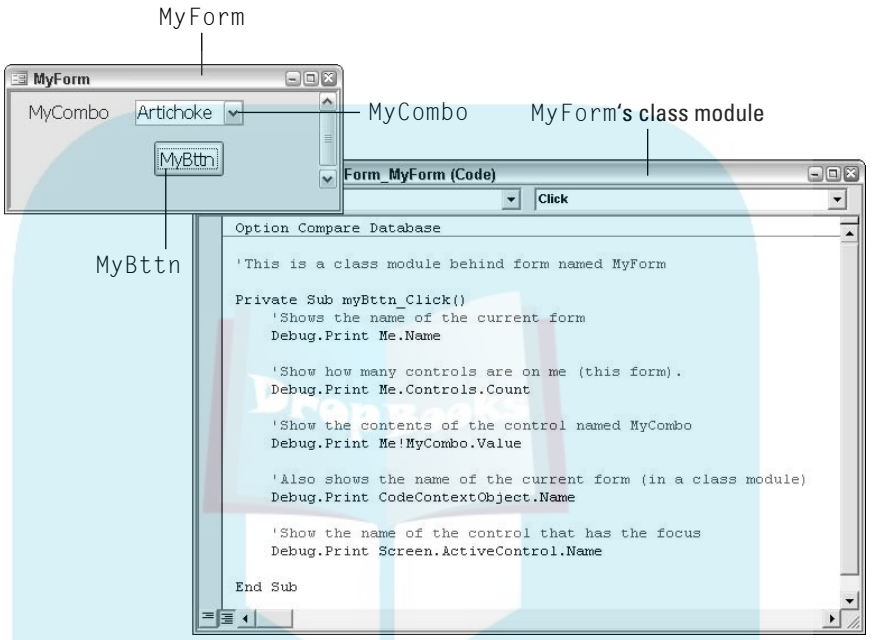

Figure 8-4: A form, some controls, and a class procedure.

`Screen.ActiveControl.Value` returns whatever value is stored in whatever control onscreen currently has the focus.

Using the continuation character

When writing VBA code, you can break a long line into two lines by using a *continuation character*, which is just an underscore (_). Many programmers use continuation characters to break lengthy VBA statements into two or more lines. This is especially true with code you see printed in books and such because the code needs to fit within the margins of the book.

For example, here's a fairly long line of code that barely fits within the margins in this book:

```
Public Sub MySum(anyName As String, anyNum as Number)
```

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Here's the same line broken into two lines by using a continuation character:

```
Public Sub MySum(anyName As String, _
   anyNum as Number)
```

When VBA sees the continuation character at the end of a statement, it knows that the line to follow is a continuation of the current statement, so it treats the two (or however many lines) as one long line.

If you want to use the continuation character when writing your own code, be aware that the continuation character never inserts blank spaces. If you need a blank space before the next word in a broken line, put a blank space in front of the continuation character. For example, the preceding example actually ends with a blank space and *then* the continuation character.

Also, be aware that you can't use a continuation character within a literal string in code. A *literal string* is any text that's enclosed in quotation marks. For example, the following line assigns a fairly long line of literal text to a control named `MyCombo` on the current form:

```
Me!MyCombo.Value = "Literal text in quotation marks"
```

It would be perfectly okay to break the preceding line as follows because the continuation character isn't inside the literal text:

```
Me.MyCombo.Value = _
   "Literal text in quotation marks"
```

However, if you try to break the line within the literal text as follows:

```
    Me.MyCombo.Value = "Literal text _
in quotation marks"
```

the code will fail when executed, and you'll get a syntax error.

I should mention, though, that there are a couple of ways to break long strings of literal text in code. One is to just keep adding chunks of text to a string variable by using *`variableName = variableName + "nextString"`*. You can see an example of that when building the `mySql` variable in Chapter 7.

The other way in which you can use an alternative to building a variable is to break the large literal into smaller literals, each surrounded by quotation marks. Concatenate (join) the strings by using the + sign, breaking the line with a continuation character immediately after the + sign. For example, you could break the long literal, shown in the previous example, as follows:

```
Me.MyCombo.Value = "Literal text" + _
   " in quotation marks"
```

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Don't forget to include any blank spaces between words inside your quotation marks. For example, the space before `in` in the preceding line is the blank space between the words `text` and `in`.

When VBA "unbreaks" the line, as follows:

```
Me.MyCombo.Value = "Literal text" + " in quotation marks"
```

the whole line still makes sense and executes perfectly, placing the words `Literal text in quotation marks` inside a control named `MyCombo` on the currently open form.

The first line in the following declares a string variable named `SomeString`. The next four lines are actually one long line that stores a lengthy chunk of text in the variable. Again, notice how each portion is contained within its own quotation marks. Each broken line ends with a + sign (to join strings) and an underscore (to continue the same line):

```
Dim SomeString As String
SomeString = "You can break VBA statements using " + _
   " an underscore, but not inside a literal. If" + _
   " you want to break a long literal, you have to" + _
   " enclose each chunk in its own quotation marks."
```

Okay, enough talk about general VBA stuff. The title of this chapter is "Putting Recordsets to Work," and you're going to do that right now. Next you'll create a real solution to a real problem (for some people, anyway) using VBA, some recordsets, and a little bit of everything else described in previous chapters.

Skipping Over Used Mailing Labels

Suppose that you often use Access to print mailing labels on individual sheets. Each time you print a partial sheet of labels, you end up with some extra unused labels on the sheet. If you reuse that sheet of labels in the printer, Access will print right on the missing labels. Basically, you can't reuse a sheet of labels that's already partially used. That's not good because labels aren't cheap.

A solution to the problem is to pop up a dialog box like the one shown in Figure 8-5 just before Access is about to print the labels. There, the user can specify how many empty places are on the first sheet. Then the user clicks the Print button. Access prints the labels, skipping over the places left behind by used labels. No more wasted labels!

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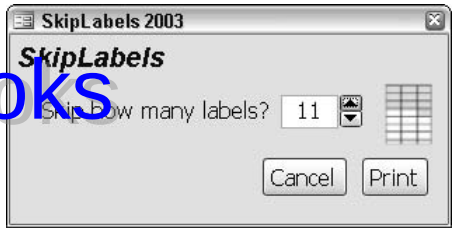

Figure 8-5: The SkipLabelsForm form.

The solution to the problem requires a form and some VBA code. The form is needed because you need some way of telling the procedure how many labels to skip. In the example shown in Figure 8-5, the form itself is named `SkipLabelsForm`. The control in which the user types the number of labels to skip is named `LabelsToSkip`. The form also contains a couple of buttons named `CancelBttn` and `PrintBttn`, to which you can tie code later. Figure 8-6 shows the exact name of the form and controls in Design view.

You don't need to type any code or create any forms if you just download `SkipLabels` from `www.coolnerds.com/vba`.

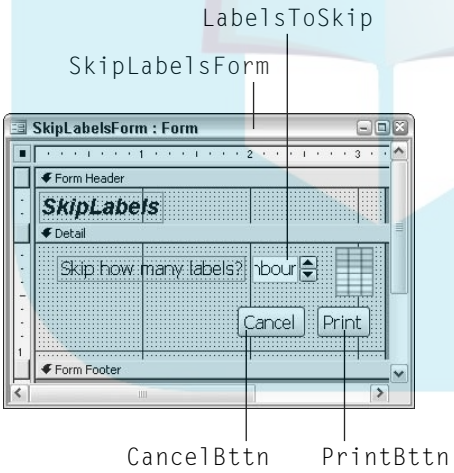

Figure 8-6: Names of some objects referred to in code.

The procedure that you're about to create doesn't actually print labels. Your database needs a report format for that. You can easily create a report for printing labels via the Access Label Wizard. In Access, click Reports in the database window and then click New on the toolbar. Choose Label Wizard and choose the table or query from which the report will get names and addresses. Then click Next and follow the instructions presented by the Label Wizard.

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For this example, I created a label format report named `Avery 8462 Labels` that's bound to a query named `SkipLabelsSampleQry`. However, you won't use these names in the VBA code because you want your `SkipLabels` procedure to work with any label-printing report, regardless of what table or query that report is bound to. So within the VBA code, refer to the report that prints the labels as `ReportName` and the reports underlying table or query as `RecSource` (see Figure 8-7).

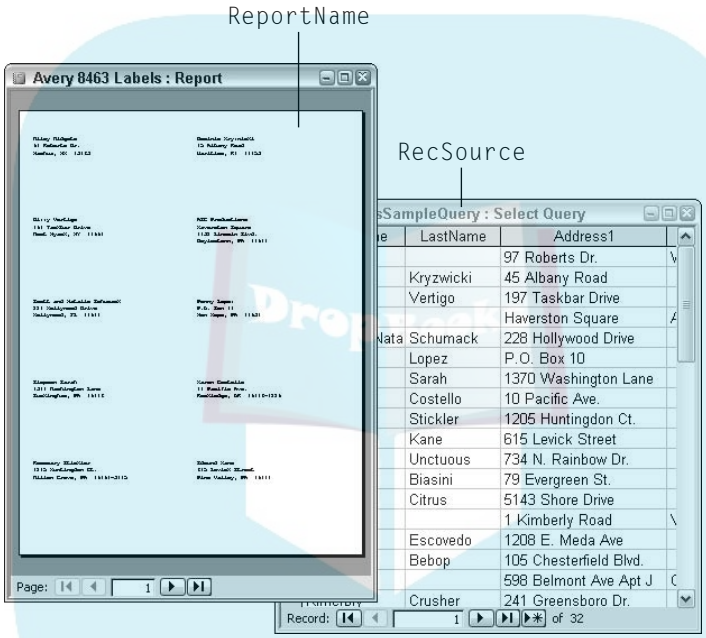

Figure 8-7: Label report and record source.

For `SkipLabels` to work, it needs to pad the top of the record source for the report with one blank record for each label to be skipped over. For example, if `SkipLabels` needs to skip over seven empty spots on a sheet of labels, it inserts seven blank records at the top of the label report's record source. That way, when the sheet actually prints, the empty records get "printed" first (on the empty spots), and real data starts printing on the first available label. Figure 8-8 illustrates the basic idea.

Getting those blank records to the top of the report's record source is no small feat. Plus, you don't want `SkipLabels` to insert blank records into any real tables or make changes to any real reports in your database. `SkipLabels` will create and work with copies of the necessary objects: It always creates a report named `TempLabels` report that prints data from a table named `LabelsTempReport`. It creates both of those objects, on-the-fly, each time.

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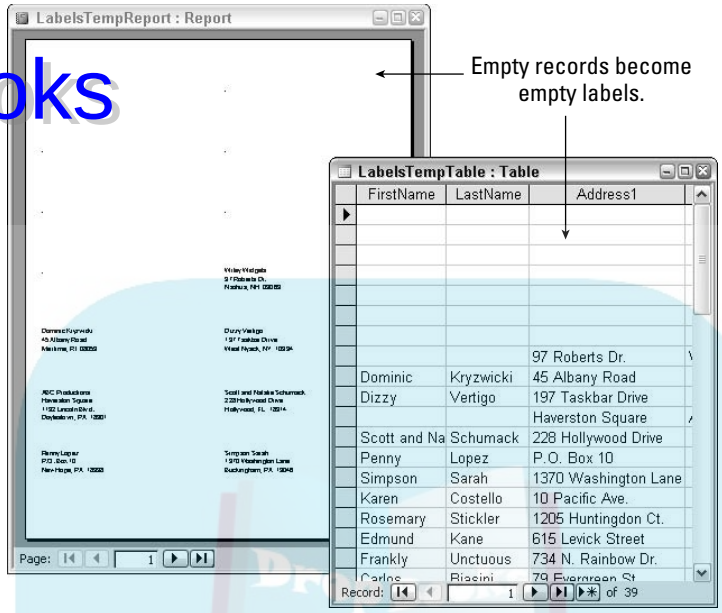

Figure 8-8: Blank records equal skipped-over labels.

Of course, you can't write `SkipLabels` in such a way that it always skips the same number of labels on the same report. You need to make it flexible enough to work with any number of empty labels on any label report. To provide flexibility, treat the number of labels to skip and the report names as *parameters* (values that get passed to an argument). In other words, write the `SkipLabels` procedure so that it can be executed at any time, using the following syntax:

```
SkipLabels(ReportName, LabelsToSkip)
```

where *`ReportName`* is the name of the report to print, and *`LabelsToSkip`* is a number indicating the number of blank labels at the top of the page. For example, the following statement tells `SkipLabels` to print the report named `Avery 8462 Labels`, skipping over the first seven used labels on the first page:

```
SkipLabels("Avery 8462 Labels",7)
```

The code required to meet all these goals isn't brief, but you don't even need to look at it if you don't want to. All you need to really know about `SkipLabels` is how to get it into a standard module in your own database and how to call it to work with your own labels. You can skip to the section, "Calling a Procedure from an Event," later in this chapter if you'd rather skip the morbid details for now.

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How SkipLabels Works

Those of you who are ready to look at some VBA code in detail can continue reading here. Be forewarned that the `SkipLabels` procedure (Listing 8-1), which you're about to see in its entirety, is not short. It probably looks more intimidating than need be. However, like all procedures, `SkipLabels` is just a series of small steps carried out in a specific order to achieve some goal; `SkipLabels` just has to go through more steps than most procedures.

You don't need to type in `SkipLabels` yourself. Just download `SkipLabels` from `www.coolnerds.com/vba`.

Listing 8-1: SkipLabels

```
Sub SkipLabels(ReportName As String, LabelsToSkip As Byte, _
   Optional PassedFilter As String)

   'Declare some variables.
   Dim MySQL, RecSource, FldNames As String
   Dim MyCounter As Byte
   Dim MyReport As Report

   'Turn off warning messages.
   DoCmd.SetWarnings False

   'Copy the original label report to LabelsTempReport
   DoCmd.CopyObject , "LabelsTempReport", acReport, ReportName

   'Open LabelsTempReport in Design view.
   DoCmd.OpenReport "LabelsTempReport", acViewDesign

   'Get name of report's underying table or query,
   'and store it here in the RecSource variable.
   RecSource = Reports!LabelsTempReport.RecordSource

   'Close LabelsTempReport
   DoCmd.Close acReport, "LabelsTempReport", acSaveNo

   'Declare an ADODB recordset named MyRecordSet
   Dim cnn1 As ADODB.Connection
   Dim MyRecordSet As New ADODB.Recordset
   Set cnn1 = CurrentProject.Connection
   MyRecordSet.ActiveConnection = cnn1

   'Load data from RecSource into MyRecordSet
   MySQL = "SELECT * FROM [" + RecSource + "]"
   MyRecordSet.Open MySQL, , adOpenDynamic, adLockOptimistic
```

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```
'Grab field names and data types from Fields collection.
Dim MyField As ADODB.Field
For Each MyField In MyRecordSet.Fields
   'Convert AutoNumber fields (Type=3) to Longs
   'to avoid insertion problems later.
   If MyField.Type = 3 Then
      FldNames = FldNames + "CLng([" + RecSource + _
        "].[" + MyField.Name + "]) As " + MyField.Name + ","
   Else
      FldNames = FldNames + _
        "[" + RecSource + "].[" + MyField.Name + "],"
   End If
Next

'Remove trailing comma.
FldNames = Left(FldNames, Len(FldNames) - 1)

'Create an empty table with same structure as RecSource,
'but without any AutoNumber fields.
MySQL = "SELECT " + FldNames + _
   " INTO LabelsTempTable FROM [" + _
RecSource + "] WHERE False"
MyRecordSet.Close

DoCmd.RunSQL MySQL

'Next we add blank records to empty LabelsTempTable.
MySQL = "SELECT * FROM LabelsTempTable"
MyRecordSet.Open MySQL, , adOpenStatic, adLockOptimistic
For MyCounter = 1 To LabelsToSkip
   MyRecordSet.AddNew
   MyRecordSet.Update
Next

'Now LabelsTempTable has enough empty records in it.
MyRecordSet.Close

'Build an SQL string to append all records from original
'record source (RecSource)into LabelsTempTable.
MySQL = "INSERT INTO LabelsTempTable"
MySQL = MySQL + " SELECT [" + RecSource + _
   "].* FROM [" + RecSource + "]"

'Tack on the PassedFilter condition, if it exists.
If Len(PassedFilter) > 1 Then
   MySQL = MySQL & " WHERE " & PassedFilter
End If

'Append the records
DoCmd.RunSQL MySQL
```

(continued)

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```
    'LabelsTempTable is done now.
    'Next we make LabelsTempTable the Record Source for LabelsTempReport.
    DoCmd.OpenReport "LabelsTempReport", acViewDesign, , , acWindowNormal
    Set MyReport = Reports![LabelsTempReport]
    MySQL = "SELECT * FROM LabelsTempTable"
    MyReport.RecordSource = MySQL
    DoCmd.Close acReport, "LabelsTempReport", acSaveYes

    'Now we can finally print the labels.
    DoCmd.OpenReport "LabelsTempReport", acViewPreview, , , acWindowNormal

    'Note: As written, procedure just shows labels in Print Preview.
    'To get it to actually print, change acPreview to acViewNormal
    'in the statement above.

End Sub
```

Okay, that was intimidating. In the next sections, I pick apart `SkipLabels` and see exactly what makes it tick. If you've lost your appetite to get into the details of it all, you can still skip ahead to "Calling a Procedure from an Event," later in this chapter.

Passing data to SkipLabels

The first line of `SkipLabels` gives the procedure its name and sets it up to accept either two or three arguments from whatever programmer runs it. The first argument, `ReportName`, stores the name of the report to skip. The second argument stores the number of labels to skip as a number. The optional third parameter, if passed, is stored under the name `PassedFilter`:

```
Sub SkipLabels(ReportName As String, LabelsToSkip As Byte, _
    Optional PassedFilter As String)
```

For the sake of example, say that an event procedure calls on `SkipLabels` by using the following command:

```
Call SkipLabels ("My8462Labels",7)
```

Right away, the variable named `ReportName` gets the value `My8462Labels`, and `LabelsToSkip` gets the value `7`. The `PassedFilter` gets no value because it wasn't used in the calling command.

If a procedure called `SkipLabels` uses all three parameters, as follows:

```
Call SkipLabels ("My8462Labels",7,"[CustID]=123")
```

the variable named `PassedFilter` would store `[CustID]=123` as its value.

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Declaring variables

The next task within SkipLabels is to create some variables for storing information as the code executes. Those statements are shown as follows. You'll see those variable names put to use later in the procedure:

```
'Declare some variables
Dim MySQL, RecSource, FldNames As String
Dim MyCounter As Byte
Dim MyReport As Report
```

The SkipLabels procedure executes some action queries (SQL statements) while doing its job. To prevent those queries from displaying warnings, the next line of code turns off the warning messages:

```
    DoCmd.SetWarnings False
```

Copying the label report

To play it safe with original objects, SkipLabels works with copies of those objects. This next statement uses the CopyObject method of the DoCmd object to make a copy of the label report. Notice how it uses ReportName, passed to the procedure in an argument, to determine which report to copy.

```
DoCmd.CopyObject, "LabelsTempReport", acReport, ReportName
```

Referring to the earlier examples of calling SkipLabels with the syntax Call SkipLabels ("My8462Labels",7), after the preceding line executes, the report format named LabelsTempReport would be an exact copy of the report named My8462Labels.

Getting a report's record source

To work with data from a report, SkipLabels needs to figure out where that report is getting its data. Every form and report has an exposed .RecordSource property that VBA can query to find out the name of the table or query to which the form or report is attached. However, VBA can get that information only if the report (or form) is currently open in Design view. In SkipLabels, this next statement opens LabelsTempReport in Design view:

```
'Open LabelsTempReport in Design view.
DoCmd.OpenReport "LabelsTempReport", acViewDesign
```

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In the following, the first line stores in the variable named `RecSource` the name of the table or query from which the report gets its data. The second line then closes `LabelsTempReport` because there's no need for it to be open in Design view any more:

```
    RecSource = Reports!LabelsTempReport.RecordSource

    DoCmd.Close acReport, "LabelsTempReport", acSaveNo
```

Remember that from this point on in the code, the name `RecSource` refers to the name of the table or query in which data to be printed on labels is stored. The code can let that variable sit for now and move on to the task of creating `LabelsTempTable`, which is the table that `SkipLabels` will use to store blank records and data to be printed on labels.

Creating the recordset

`SkipLabels` uses a recordset (and some action queries) to do its job. The next lines in the procedure, as follows, create a recordset named `MyRecordSet`, which you'll see put to use shortly:

```
    'Declare a recordset named MyRecordSet that gets its
    'data from the current database's tables.
    Dim cnn1 As ADODB.Connection
    Dim MyRecordSet As New ADODB.Recordset
    Set cnn1 = CurrentProject.Connection
    MyRecordSet.ActiveConnection = cnn1
```

Creating LabelsTempTable from MyRecordSet

At this point in the code, an empty recordset named `MyRecordSet` is just waiting to get filled with some data. The following statement creates a SQL statement using whatever is stored in `RecSource` as the name of the table from which to get records:

```
MySQL = "SELECT * FROM [" + RecSource + "]"
```

For the sake of example, say that the record source is a query named `New Customers Qry`. In that case, the `MySQL` variable would receive as its value the following string:

```
SELECT * FROM [New Customers Qry]
```

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At this point in the procedure, `MyRecordSet` has the same fields as the original table. The code now needs to create a new table from that recordset, but there's a snag. If the current table contains any `AutoNumber` fields, you won't be able to append blank records to the top of the table. So rather than create an exact clone of the original table, the procedure creates a semi-clone where any `AutoNumber` fields are converted to `Long Integers`. That way, you'll be able to append blank records to the final table.

To determine the name and data type of each field in the recordset, the following loop looks at each field in `MyRecordSet`'s structure, particularly the `.Name` and `.Type` (data type) property of each field. When used in a recordset, the `.Type` property of a recordset returns a number indicating the data type of the field, as listed here:

AutoNumber	3
Text	202
Memo	203
Date/Time	7
Currency	6
Yes/No	11
OLE Object	205
Hyperlink	203
Byte	17
Integer	2
Long Integer	3
Single	4
Double	5

The next big step in the `SkipLabels` procedure involves creating a string of field names in the `FldNames` variable (declared earlier in the procedure as a string). To do this, the following code uses a `For Each...Next` loop to analyze the name (`.Name` property) and data type (`.Type` property) of each field in the recordset. If the field's data type is an `AutoNumber` field, the code uses the built in `CLng()` (Convert to Long) function to convert it to a regular long integer:

```
Dim myField As ADODB.Field
For Each myField In myRecordSet.Fields
   'Convert AutoNumber fields (Type=3) to Longs
   'to avoid insertion problems later.
   If myField.Type = 3 Then
      FldNames = FldNames + "CLng([" & RecSource & _
        "].[" & myField.Name & "]) As " & myField.Name & ","
```

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```
    Else
        FldNames = FldNames & _
            "[" & RecSource & "].[" & myField.Name & "],"
    End If
Next
FldNames = Left(FldNames, Len(FldNames) - 1) 'Remove trailing comma.
```

Suffice it to say that when the last statement is executed, the `FldNames` variable will contain a list of field names organized in such a way that they can be used in a SQL statement to create a new table with a structure similar to the original record source table's (or query's) structure. For example, if the record source table contains an `AutoNumber` field named `CustID` and some text fields named `FirstName`, `LastName`, `Address1`, and so forth, `FldNames` ends up containing something like this (as one long line that's too wide for the margins here):

```
CLng([CustID]) As CustID, [FirstName], [LastName], [Company],
        [Address1], [Address2], [City], [StateProv],
        [ZIPPostalCode], [Country]
```

When executed as part of a SQL statement, the `CLng()` function converts the `AutoNumber CustID` field to a long integer, which makes it easier to append records to the top of the `LabelsTempTable`. The next line creates an SQL statement using field names from the recordset and additional text needed to create a table:

```
    mySQL = "SELECT " & FldNames & " INTO LabelsTempTable
        FROM [" & RecSource & "] WHERE False"
```

Recall that `RecSource` is the name of the table or query that contains the data to print on labels. If that table is named `Customers` and it has field names like the preceding example, `mySQL` ends up being a valid SQL statement, something like this:

```
SELECT CLng([CustID]) As CustID, [FirstName], [LastName],
        [Company], [Address1], [Address2], [City],
        [StateProv], [ZIPPostalCode], [LabelCountry] INTO
        LabelsTempTable FROM [Customers] WHERE False
```

The `WHERE False` part of the SQL statement prevents any records from being copied into the new `LabelsTemp` table. When executed, the following statements create `LabelsTempTable` as a new, empty table and then close the recordset (which was needed only to determine field names and data types from the original report's record source):

```
    myRecordSet.Close

    DoCmd.RunSQL mySQL
```

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After the preceding statements execute, `LabelsTempTable` is an empty table that's nearly identical to the report's underlying table but with `AutoNumber` fields defined as `Long Integer` fields. The chunk of code creates a new recordset that matches the currently empty `LabelsTempTable` table. The `.AddNew` and `.Update` methods within the loop add one new blank record to `LabelsTempTable`. Notice how those statements are in the `For...Next` loop that counts from `1` to `LabelsToSkip`. That `LabelsToSkip` variable contains the number of labels to be skipped over. So basically the following code adds as many blank records to `LabelsTempTable` as are needed to skip over the appropriate number of labels:

```
'Next we add blank records to empty LabelsTempTable.
MySQL = "SELECT * FROM LabelsTempTable"
MyRecordSet.Open MySQL, , adOpenStatic, adLockOptimistic

For MyCounter = 1 To LabelsToSkip
   MyRecordSet.AddNew
   MyRecordSet.Update
Next

'Now LabelsTempTable has enough empty records in it.
MyRecordSet.Close
```

The next statements form a SQL statement to append all records from the original record source onto `LabelsTempTable`. For example, if the name of the original record source table is `Customers`, `mySQL` ends up being `INSERT INTO LabelsTempTable SELECT [Customers].* FROM [Customers]`. That statement is basically an append query that adds all the records from the original table to `LabelsTempTable`. When the SQL statement executes, the records from the original table are appended onto `LabelsTempTable` beneath the blank records that are already in `LabelsTempTable`:

```
mySQL = "INSERT INTO LabelsTempTable"
mySQL = mySQL + " SELECT [" & RecSource & _
   "].* FROM [" & RecSource & "]"
DoCmd.RunSQL mySQL
```

After the preceding code runs, `LabelsTempReport` is an exact clone of the original label report. `LabelsTempTable` is a clone of all the records to be printed on the labels, with blank records on top, as shown in Figure 8-8.

The next statements open `LabelsTempReport` in Design view and set its recordsource to print all records from `LabelTempTable`. It does so by changing the `Record Source` property of `LabelsTempReport` to an SQL statement that prints all records from `LabelsTempTable`:

```
DoCmd.OpenReport "LabelsTempReport", acViewDesign, , , acWindowNormal
Set myReport = Reports![LabelsTempReport]
mySQL = "SELECT * FROM LabelsTempTable"
myReport.RecordSource = mySQL
DoCmd.Close acReport, "LabelsTempReport", acSaveYes
```

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At this moment in time, everything is ready to go. `LabelsTempReport` is bound to `LabelsTempTable`, which in turn contains all the necessary blank records on top followed by all the records that actually need to be printed. So now VBA just needs to print the report. As written, the code just displays the results in Print Preview, using this statement:

```
'Now we can finally print the labels.
DoCmd.OpenReport "LabelsTempReport", acViewPreview, , , acWindowNormal
```

Using Print Preview is just a means of testing and debugging the code without wasting a lot of paper on trial runs. In an actual working environment, you'll want the code to actually print the labels. That's simple to do. Just change the work `acViewPreview` to `acNormal` in that last statement, as follows:

```
DoCmd.OpenReport "LabelsTempReport", acViewNormal, , , acWindowNormal
```

`SkipLabels` is now done. The final two statements set the object variables named `cnn1` and `MyReport` (defined earlier in the procedure with `Set` statements) each to `Nothing`. This is just a little housekeeping step before the procedure ends:

```
    'Free up the object variables.
    Set cnn1 = Nothing
    Set MyReport = Nothing
End Sub
```

By the time the `End Sub` statement is executed, the labels will be printing (or getting ready to print), and `SkipLabels` is done. You can close and save the standard module, giving it any name you like. In the download from `www.coolnerds.com/vba`, you'll find all the `SkipLabels` code in a standard module named `SkipLabels 2003`.

Calling a Procedure from an Event

At this stage of the game, your database contains a standard module that contains a `Sub` procedure named `SkipLabels()`. Because you haven't yet actually tied the `SkipLabels` procedure to any event, there's nothing in the database yet to take advantage of `SkipLabels()`.

Recall that earlier in the chapter, I show a form with a control named `LabelsToSkip` (it stores the number of labels to be skipped over) as well as a Cancel and a Print button. If the user clicks Cancel, you just want `SkipLabelsForm` to close without doing anything. If the user clicks the Print button, you want the form to call `SkipLabels` with the appropriate label report name and number of labels.

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When you want an event procedure on a form to call a standard procedure, use the syntax

```
Call procedureName (arguments)
```

where *procedureName* is the name of the procedure to call, and *arguments* are values for whatever required arguments the procedure is expecting. `SkipLabels()` requires at least two arguments: the name of the labels report and the number of labels to skip. Here's how you could get the Print button in `SkipLabels` form to call `SkipLabels ()` when clicked:

1. **Open `SkipLabelsForm` (or whatever form you created) in Design view and click the button that will call `SkipLabels`.**
2. **On the Event tab of the Properties sheet, click the `On Click` event for the Print button.**
3. **Click the Build button and choose Code Builder. You'll be taken to the VBA editor with the cursor inside the event procedure.**
4. **Type the following into the procedure:**

   ```
   Call SkipLabels("[YourReportName]", [LabelsToSkip].Value)
   ```

   substituting *YourReportName* with the name of the report in your database that prints labels.

   For example, if your database contains a report named `Avery 8462 Labels`, you'd type **Call SkipLabels("Avery 8462 Labels", [LabelsToSkip].Value)** as shown in the second procedure, `PrintBttn_Click()` in Figure 8-9.

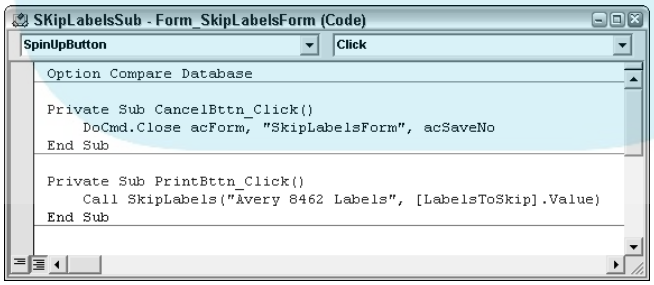

Figure 8-9: The `PrintBttn_Click()` procedure called the `SkipLabels` Sub.

The first procedure in that figure — `CancelBttn_Click()` — in that class module just closes `SkipLabelsForm` without doing anything and is tied to the `On Click` event of the form's Cancel button.

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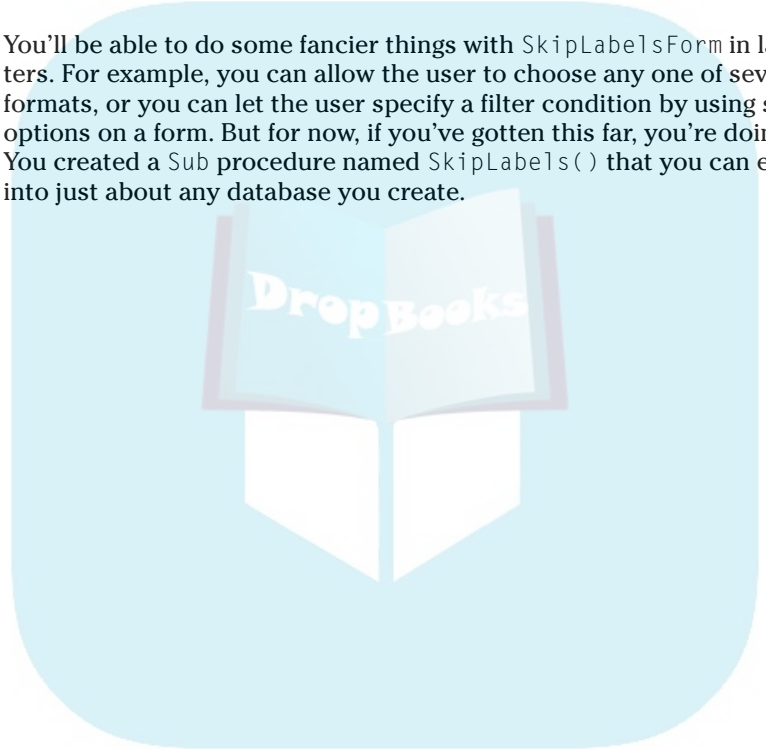
The syntax for calling a custom VBA function from an `Event` procedure is `=functionName(arguments)`, which is clearly different from calling a `Sub` procedure with `Call procedureName (arguments)`. I talk more about custom functions in Chapter 11.

5. **Choose File➪Save and Return to Microsoft Access from the VBA editor's menu bar.**

The button's `On Click` event shows `Event Procedure`, as usual. Now you can close and save the form and then reopen it in Form view to try it out.

You'll be able to do some fancier things with `SkipLabelsForm` in later chapters. For example, you can allow the user to choose any one of several label formats, or you can let the user specify a filter condition by using simple options on a form. But for now, if you've gotten this far, you're doing great. You created a `Sub` procedure named `SkipLabels()` that you can easily drop into just about any database you create.



Part IV

Applying VBA in the Real World

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"You ever get the feeling this project could just up and die at any moment?"

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In this part . . .

Some of the programming techniques in this chapter are a bit trickier than techniques from previous chapters, but they're not just stupid pet tricks. They're actually useful tricks. What makes them tricky has to do with the way you use VBA to trick Access into doing things it couldn't possibly do on its own. In the real world, people rarely write code that works perfectly right off the bat. Even experienced programmers have to spend some time testing and debugging their code. In this part you discover the many tools that VBA offers to help you with testing and debugging.

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Chapter 9

Creating Your Own Dialog Boxes

In This Chapter

- Asking questions, responding to answers
- Storing dialog box settings
- Creating custom dialog boxes
- Creating spin box controls

You see dialog boxes in Windows and other programs all the time. Each dialog box presents some options for you to choose from. The name *dialog box* stems from the fact that the user and the dialog box carry on a sort of conversation. The dialog box presents some options, and the user makes selections from those options and then clicks OK.

When you're creating a database, you might want to put your own dialog box (or other message) onscreen so the user can make some choices. Creating dialog boxes in Access is easier than you might think because each dialog box is just an Access form with certain settings that make the form look and act more like a dialog box than a regular Access form.

In addition to dialog boxes, your database can also display small custom messages onscreen. A message is a dialog box of sorts because it presents information or a question to the user and waits for the user to respond. And you don't even have to create an entire dialog box to display a small message onscreen: You can just use the VBA `MsgBox()` function instead.

In this chapter, I look at message and dialog boxes, showing examples of programming each. I start with message boxes because those are the easiest to create.

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Displaying and Responding to Messages

When you want your database to give the user a little feedback or have the user answer a simple Yes/No question, you can use a message box. The message box can be a simple feedback message with a single OK button, like the example shown at the left side of Figure 9-1. Or, the message box can ask a question and wait for an answer, as in the right side of Figure 9-1.

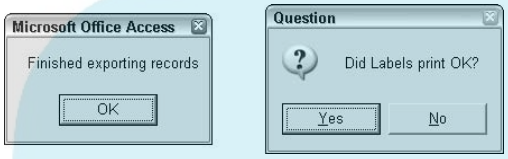

Figure 9-1: Examples of message boxes.

There are two syntaxes for the `MsgBox` keyword. If you just want the message to show some text and an OK button, use the syntax

```
MsgBox "YourMessageHere"
```

where *YourMessageHere* is the text that you want the message box to display. For example, here's the complete VBA code to display the message on the left side of Figure 9-1:

```
MsgBox "Finished exporting records"
```

If you type that exact statement into the VBA Editor Immediate window and press Enter, you'll see the message box onscreen. When you click its OK button, the message box closes.

The preceding syntax, where you just follow the `MsgBox` statement with a message enclosed in quotation marks, works only when you don't specify buttons to display in the message box. The message box will have only an OK button, and clicking that button closes the message box.

If you want your message box to ask a question and give the user some choices as to how to respond, you have to use a different syntax, as discussed next.

Asking a question

If you want your message box to ask a question and show Yes/No buttons, you have to use the `MsgBox()` function with the following syntax:

```
Dim Variable As Integer
Variable = MsgBox("YourQuestion",buttons,["title"])
```

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where

- *Variable* is a variable name of your choosing.
- *YourQuestion* is the text to be displayed in the box.
- *buttons* is a number or constant defining buttons to display and other message box properties, as discussed in the upcoming section, "Designing a message box."
- *title* is an optional title that appears in the title bar of the message box.

For example, the following lines of code below display the message box shown on the right side of Figure 9-1. When the user clicks a button, the variable named Answer stores a number indicating which button the user clicked.

```
Dim Answer As Integer
Answer = MsgBox("Did Labels print OK?", vbQuestion + vbYesNo, "Question")
```

Whenever VBA displays a message box, it stops executing code in your procedure. In other words, any lines below the statement in the code are ignored until the user clicks a button in the message box. At that point, VBA can decide what to do based on which button the user clicked. But before I get to that, look at all the different ways you can control the appearance and behavior of a message box.

Designing a message box

You can use the *buttons* argument of the MsgBox keyword to define the exact appearance and behavior of your message box. Each possible value for the buttons argument can be expressed as either a constant or a number. You can add the constants or numbers together to combine properties.

For example, the constant vbYesNo (or number 4) tells MsgBox to display Yes and No buttons in the form. The constant vbQuestion (or number 32) tells MsgBox to display a question mark icon in the form. Combining the two arguments with a + sign in the MsgBox statement applies both properties. For example, using vbYesNo + vbQuestion together as the *buttons* argument in the following example displays the dialog box shown on the right side of Figure 9-1. There you can see the question mark icon and Yes/No buttons in the message box.

```
Answer = MsgBox("Did Labels print OK?", vbQuestion + vbYesNo, "Question")
```

Whenever VBA encounters a MsgBox statement in code, it displays the message box onscreen and then waits for the user to respond to the box. Code beneath the MsgBox statement within the procedure isn't executed until the user responds to the message box.

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Modal and pop-up messages

The *buttons* argument lets you define how the message box looks when it first opens and also how it behaves while it's open. By default, a message box is always *application modal.* That is, after the message box is onscreen, the user can't do anything else in Access until he or she replies to the message. With the *buttons* argument, you can make the message box *system modal,* which means the user can't do anything in any other program until he responds to the message.

With the *buttons* argument, you can also make the message box a *pop-up.* As a pop-up, the message box will always jump to the top of the stack of whatever other windows happen to be open onscreen, therefore guaranteeing that the message box will be visible to the user onscreen.

Message box default buttons

You can even define a default button for the message. The default button is the button that's automatically selected when the message box first opens. It's also the button that gets clicked if the user just presses the Enter key to close the message box. For example, the following statement displays a message box with Yes, No, and Cancel buttons with the third button (Cancel) already selected (highlighted) in the box:

```
Answer = MsgBox("Hello World", vbYesNoCancel + vbDefaultButton3)
```

Because the Cancel button is the default button in that example, if the user just presses the Enter key in response to the message, that is the same as the user clicking the Cancel button.

The complete set of MsgBox *buttons* argument settings are shown in Table 9-1. The first six settings, (0 through 5) specify buttons to show in the message box. Those settings also specify which values the variable at the left side of the statement could get when the user clicks a button, as I discuss next.

Table 9-1 Constants and Numbers used for MsgBox *buttons* Argument

Constant	*Number*	*Displays*	*Returns*
vbOKOnly	0	OK button.	vbOK
vbOKCancel	1	OK, Cancel buttons.	vbOK or vbCancel
vbAbortRetryIgnore	2	Abort, Retry, Ignore buttons.	vbAbort, vbRetry, vbIgnore

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Constant	*Number*	*Displays*	*Returns*
vbYesNoCancel	3	Yes, No, Cancel buttons.	vbYes, vbNo, vbCancel
vbYesNo	4	Yes, No buttons.	vbYes, vbNo
vbRetryCancel	5	Retry, Cancel buttons.	vbRetry, vbCancel
vbCritical	16	Red X icon.	
vbQuestion	32	Question icon.	
vbExclamation	48	Exclamation icon.	
vbInformation	64	Information icon.	
vbDefaultButton1	8	First button is default.	
vbDefaultButton2	256	Second button is default.	
vbDefaultButton3	512	Third button is default.	
vbDefaultButton4	768	Fourth button is default.	
vbApplicationModal	0	Suspends Access objects until user replies.	
vbSystemModal	4096	Suspends all applications until user replies.	
vbMsgBoxHelpButton	16384	Show Help button in box.	
VbMsgBoxSetForeground	65536	Make message box the top window (pop–up).	
vbMsgBoxRight	524288	Right-align text in box.	
vbMsgBoxRtlReading	1048576	Right-to-left text for Hebrew/ Arabic.	

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Adding the `vbMsgBoxHelpButton` argument displays a Help button in the message box. However, the button won't work unless you create custom Help files, and that's a large topic that's beyond the scope of this book. If you're interested in learning more, see

```
www.microsoft.com/resources/documentation/office/2000/all/
          solution/en-us/part2/ch13.mspx
```

Responding to a MsgBox button click

If your dialog box asks a question, you presumably want your VBA code to respond to whatever button the user clicked. That's fairly easy to do because when the user clicks a button, the variable to the left side of the `MsgBox()` function returns a value indicating which button the user clicked. Each button that you can show in a message box returns a unique value. For example, when the user clicks the Yes button, `MsgBox()` returns `6` (which also equals Access's built-in `vbYes` constant). If the user clicks the Cancel button, `MsgBox` returns `2` (which equals the `vbCancel` constant).

In your code, you can use either the constant or the number, but it's always easier to read the code later if you use the constant. Table 9-2 lists the value — expressed both as a constant and a number — that each message box buttons returns when clicked.

Table 9-2 Values Returns by Buttons

If User Clicks	*MsgBox Returns (Constant)*	*MsgBox Returns (Integer)*
OK	`vbOK`	1
Yes	`vbYes`	6
No	`vbNo`	7
Cancel	`vbCancel*`	2
Abort	`vbAbort`	3
Retry	`vbRetry`	4
Ignore	`vbIgnore`	5

**`MsgBox()` also returns `vbCancel (2)` if the user presses the Esc key or clicks the box's Close button.*

Code execution always stops at the line when a message box is onscreen. Thus, the next line of code in your procedure can make a decision based on the contents of the variable used at the start of the VBA `MsgBox()` statement.

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For example, if the message box contains Yes and No buttons, you can use an `If` statement to do one set of steps if the user clicks Yes and another set of steps if the user clicks No. Here's the basic idea:

```
Dim Answer As Integer
Answer = MsgBox("Click a button",vbYesNo,"Test")

'Make a decision based on button user clicked.
If Answer = vbYes Then
   'Code to execute if user clicked Yes goes here.
Else
   Code to execute if user clicked No goes here.
End If
```

So here's how the preceding code executes. The `Dim` statement creates a variable (a cubbyhole) named `Answer`. The next statement displays onscreen a message box with Yes and No buttons. Code execution stops there until the user clicks a button in the message box. When the user does click a button, the `Answer` variable receives a value indicating which button the user clicked. In this example, that value will be either `vbYes` (6) or `vbNo` (7). Code execution then resumes normally at the next line in the procedure.

In the preceding example, the first executable line on code is an `If...Then... End If` statement that compares the value of the `Answer` variable with `vbYes`. Then . . .

- If the value of `Answer` is `vbYes`, only the code between `If` and `Else` is executed; code between `Else` and `End If` is ignored.
- If the value of `Answer` value is not `vbYes`, code between `If` and `Else` is ignored, and only code between `Else` and `End If` executes.

Either way, code execution then resumes normally at the next statement after the `End If` statement.

If you want to try it for yourself, you could type a little procedure like the following example into any standard module:

```
Sub MsgTest2()'Show message with Yes and No Buttons
   Dim Answer As Integer
   Answer = MsgBox("Ready?", vbYesNo)

   If Answer = vbYes Then
      'Code to execute if user clicked Yes button.
      Debug.Print "You clicked Yes"
      Beep    'Sound a beep too.
   Else
      'Code to executed if user clicked No button.
      Debug.Print "You clicked No"
   End If
End Sub
```

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After the entire procedure is typed in, you can just type its name, `MsgTest2`, into the Immediate window and try it. When you see the message box, click Yes. You'll hear a beep and see `You clicked Yes` in the Immediate window. Run the procedure a second time and click No, and you'll see `You clicked No` in the Immediate window.

You might have a situation where you want your code to do one thing if the user clicks Yes, do another thing if the user clicks No, and do yet something else if the user clicks Cancel or closes the dialog box without clicking a specific button. You can use a `Select Case` block of code to specify a different action for each of three buttons possibilities.

For example, when executed, the following `Answer = MsgBox(...)` statement displays a message box with Yes, No, and Cancel buttons. After the user clicks a button, the `Select Case...End Select` block takes one of three possible actions. If the user clicks the Yes button, only the code under `Select Case vbYes` executes. If the user clicks No, only the code under `Select Case vbNo` executes. If the user clicks the Cancel button or closes the message box by using the Close button or Esc key, only the code under `Select Case vbCancel` executes.

```
Dim Answer As Integer
Answer = MsgBox("Ready again?", vbYesNoCancel + _
           vbDefaultButton3)

Select Case Answer
   Case vbYes
          'Code to execute if user clicked Yes.
          Debug.Print "You clicked Yes"
   Case vbNo
          'Code to execute if user clicked No.
          Debug.Print "You clicked No"
   Case vbCancel
          'Code to execute if user cancelled.
          Debug.Print "You didn't click Yes or No."
End Select
```

For more information on `If...Then...End If` and `Select Case...End Select`, see the section in Chapter 4 on making decisions in VBA code.

Converting Forms to Dialog Boxes

Message boxes are fine when your code just needs to ask the user a simple question, but sometimes you want to give users several options to choose from. You might want to use a variety of controls, such as check boxes and combo boxes, to present those options. (Read about this in the upcoming

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section, "Creating Custom Combo Boxes.") When your code needs more than a simple answer to a single question, use a dialog box rather than a message box.

A dialog box (often called a *dialog* for short) in an Access database is basically the same thing as a dialog box in Windows or any other program. It's a group of options from which the user can make choices. For example, if you right-click the Windows XP Start button and choose Properties, the Windows Taskbar and Start Menu Properties dialog box opens, giving you options for customizing your Windows desktop.

Storing dialog box settings

Although creating a dialog box is easy, you need to first think about how you want to deal with the settings that the user chooses. If you want your dialog box to remember settings from one session to the next, you need to store those settings in some sort of table. Otherwise, all the user's settings will be forgotten by Access each time the user closes the database.

The table that you create for storing dialog box settings needs only one record, with a field to store each dialog box setting that needs to be remembered. In this chapter, I show you how to create a fancy dialog box for the `SkipLabels` procedure I create in Chapter 8. I show you how to make it remember which report the user last used for printing labels and how many labels the user skipped on each run. This will make it a little easier for the user to reuse settings in the dialog box.

For this example, create a tiny table that stores the name of the report as `Text` and the number of labels last skipped as a `Number`. Figure 9-2 shows the structure of the table that I use here. You don't need to define a primary key in this table because the table will never contain any more than one record. I'll name the table `SettingsTable`.

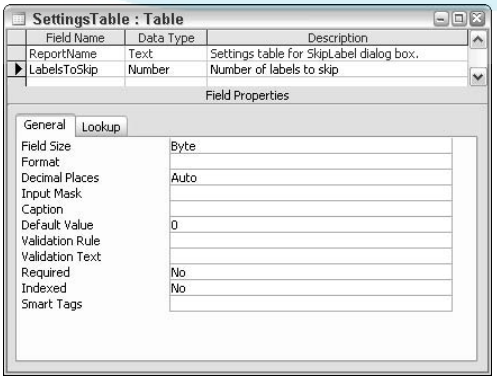

Figure 9-2: Structure of the `Settings Table` table.

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After you close and save the table, you need to open that table and type in the value of at least one field. That's because when you bind a dialog box to that table later, it will work only if the table already contains one record. For example, Figure 9-3 shows one record that I typed into the `SettingsTable` table. The blank record beneath the filled record isn't an actual record in the table. That empty record appears only as a placeholder for any new record that you want to add to the table in Datasheet view.

Figure 9-3: One table record stores dialog box settings.

You can see an example of using the `SettingsTable` values in a dialog box a little later in this chapter. For now, master how to create a dialog box in the first place.

Setting form properties

Creating a dialog box in Access is similar to creating any other form. You don't even need any VBA code to create the box. Rather, you just create a form and set its Form Properties so that the form looks and acts like a dialog box. Here's how:

1. **In the database window, click the Forms button and then click the New button.**
2. **In the New Form dialog box that opens, choose Design View.**

   If you created a table for storing settings, choose the table's name from the Choose the Table or Query Where the Object's Data Comes From drop-down list in the New Form dialog box.

   If you won't be storing settings in a table, just leave that drop-down list option empty so the form won't be bound to any table.
3. **Click OK.**
4. **If the Properties sheet isn't visible, choose View➪Properties or press F4.**

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5. **In the Properties sheet, make sure that Form is selected, and then click the All tab (see Figure 9-4).**

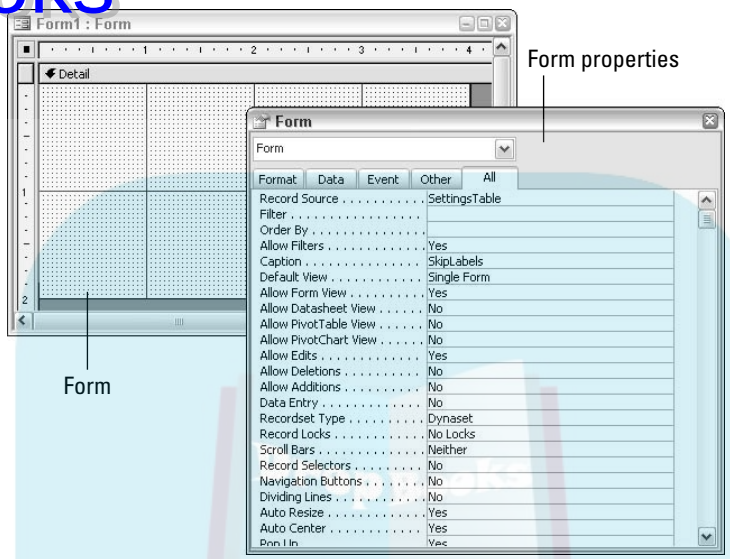

Figure 9-4: Setting form properties for a dialog box.

6. **Set the properties as indicated in Table 9-3.**
7. **Save the form.**

Table 9-3 Properties to Make a Form into a Dialog Box

Property	*Setting*	*Reason*
`Default View`	Single Form	To look like a dialog box.
`Allow Form View`	Yes	To look like a dialog box.
`Allow Datasheet View`	No	Dialog boxes have no such view.
`Allow PivotTable View`	No	Dialog boxes have no such view.
`Allow PivotChart View`	No	Dialog boxes have no such view.
`Allow Edits`	Yes	User needs to change settings.
`Allow Deletions`	No	Underlying table (if any) must contain only one record.

(continued)

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Table 9-3 *(continued)*

Property	Setting	Reason
Allow Additions	No	Underlying table (if any) must contain only one record.
Data Entry	No	Underlying table (if any) must contain only one record.
Scroll Bars	Neither	Dialog boxes don't have scroll bars.
Record Selectors	No	Dialog boxes don't have record selectors.
Navigation Buttons	No	Dialog boxes don't have navigation buttons.
Dividing Lines	No	Dialog boxes don't need them.
Pop Up	Yes	Keep dialog box on top of other open windows.
Modal	Yes	Disable other open windows until user responds to dialog box.
Border Style	Dialog	Looks like a dialog box border.
Control Box	Yes	Needed to make Close button visible.
Min Max Buttons	None	Dialog box can't be sized.
Close Button	Yes	Dialog boxes have a Close button, which acts like a Cancel button.
Cycle	Current Record	Only one record in underlying settings table.

To color your dialog box, click the Detail band in forms Design view, click its Back Color property, and choose a color. For example, for a slightly off-white color, set the `Back Color` property of the Detail band to `16316664`.

Adding controls to the dialog box

The form properties that you change to control the appearance and behavior of a form don't affect how you add controls to the form. You can still use all the standard techniques that you'd use in Access to create a form for scrolling

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through records. For example, to add a bound control to the form, click a control type in the Toolbox. Then drag the underlying field's name from the Field List to the form. To add an unbound control to the form, click a control type in the Toolbox and then click the form's Design grid.

If the Control Wizard opens after you drop a control on the form, you can go through the wizard as you normally would. If you're planning to attach custom code to the control later and don't want the wizard to create the control, just click the wizard's Cancel button. Then you can assign a name, caption, and events to the control through the control's Properties sheet.

For example, the top half of Figure 9-5 shows in Design view a sample dialog box with four main controls: `ReportName`, `LabelsToSkip`, `CancelBttn`, and `PrintBttn`. In that example, the controls `ReportName` and `LabelsToSkip` are bound to fields in the `SettingsTable` described earlier in this section. Thus, the dialog box remembers the settings in those controls from one session to the next. The lower half of Figure 9-5 shows that same form open in Form view.

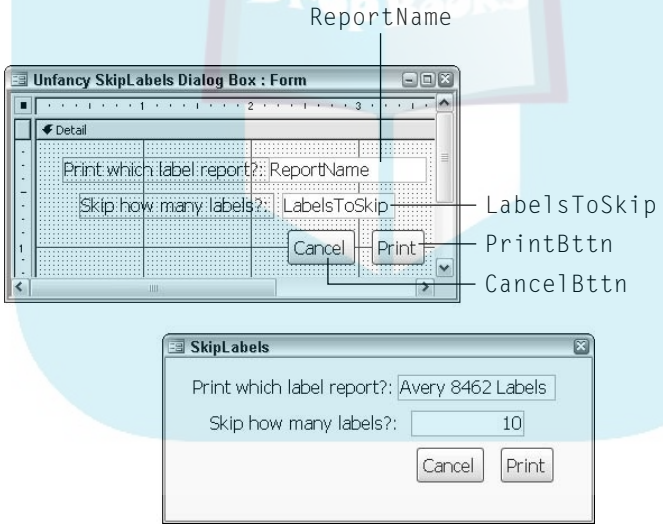

Figure 9-5: Controls on a form (dialog box).

In the sample form shown in Figure 9-5, the `CancelBttn` and `PrintBttn` controls aren't bound to any table field. Instead, each just has some custom code tied to its `On Click` event. For example, the `On Click` event for `CancelBttn` is `DoCmd.Close acForm, Me.Name, acSaveNo`, which closes the form without saving any changes or printing.

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The `On Click` event for `PrintBttn` could execute any VBA code or macro. For instance, to call the `SkipLabels` procedure described in Chapter 8, have that procedure execute the statement

```
Call SkipLabels ([ReportName].Value,LabelsToSkip].Value.
```

Doing so will print whatever report name appears in the `ReportName` control, skipping the number of labels specified in the `LabelsToSkip` control. The procedure also closes the dialog box. The following code shows the `On Click` event procedure for both controls in the class module for the sample form.

```
Private Sub CancelBttn_Click()

    'Close the SkipLabels form without doing anything.
    DoCmd.Close acForm, Me.Name, acSaveNo

End Sub
```

```
Private Sub PrintBttn_Click()

    'Print the specified labels, skipping specified blanks.
    Call SkipLabels([ReportName].Value, [LabelsToSkip].Value)

    'Then close the SkipLabels form, saving current choices.
    DoCmd.Close acForm, Me.Name, acSaveYes

End Sub
```

I help you create a much fancier `SkipLabels` dialog box in the sections that follow. But for now, you should be able to see how it works. The controls named `ReportName` and `LabelsToSkip` on the form serve as data to pass to the `SkipLabels() Sub` procedure. Clicking the Print button on the form calls the `SkipLabels` routine using the syntax

```
Call SkipLabels([ReportName].Value,[LabelsToSkip].Value)
```

When `SkipLabels` run, it prints whatever report name appears in the `Report Name` control on the form and also skips however many labels are specified in the `LabelsToSkip` control on the form.

Creating Custom Combo Boxes

A *combo box* in Access is a control that acts as both a text box and a drop-down menu of options. As you probably know, you can create two types of combo boxes in Access: those that get their values from a table or query, and those that get their values from a simple value list that you type manually.

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For example, suppose you have a database that contains a number of reports, as in the example shown in Figure 9-6. Ideally, you'd like to create a `SkipLabels` dialog box that provides a drop-down list of report names that the user can print labels on.

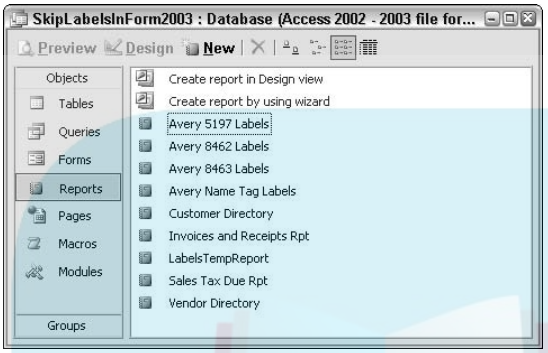

Figure 9-6: Sample reports in an Access database.

One way to do this would be to add a `ComboBox` control to your `SkipLabels` form and simply type the names of reports on which the user can print labels into the control's Value List. For example, suppose you already have a `TextBox` control named `ReportName` on a form, and you want to change that to a combo box. Open the form in Design view, right-click the `ReportName` control, and choose Change To➪Combo Box. The `ReportName` text box becomes a combo box (still named `ReportName`).

On the Data tab of the control's Properties sheet, set the Row Source Type to Value List and then set the Row Source property to the names of reports that you want to see in the drop-down menu. ***Note:*** You need to spell each report name exactly as it's spelled in the database. Enclose each report name in quotation marks and also separate names with semicolons. To ensure that the user can choose only a report name from the list, set the Limit to List property to `Yes`.

Figure 9-7 shows an example where I converted the `TextBox` control named `ReportName` to a `ComboBox` control. On the Data tab of that control's Properties sheet, I set the Row Source Type to Value List and the Row Source to the list of report names as shown here:

```
"Avery 5197 Labels";"Avery 8462 Labels";"Avery 8463 Labels";
          "Avery Name Tag Labels"
```

The lower half of Figure 9-7 shows that same combo box open in Form view. The drop-down menu lists the report names that show in the Value List property of the control.

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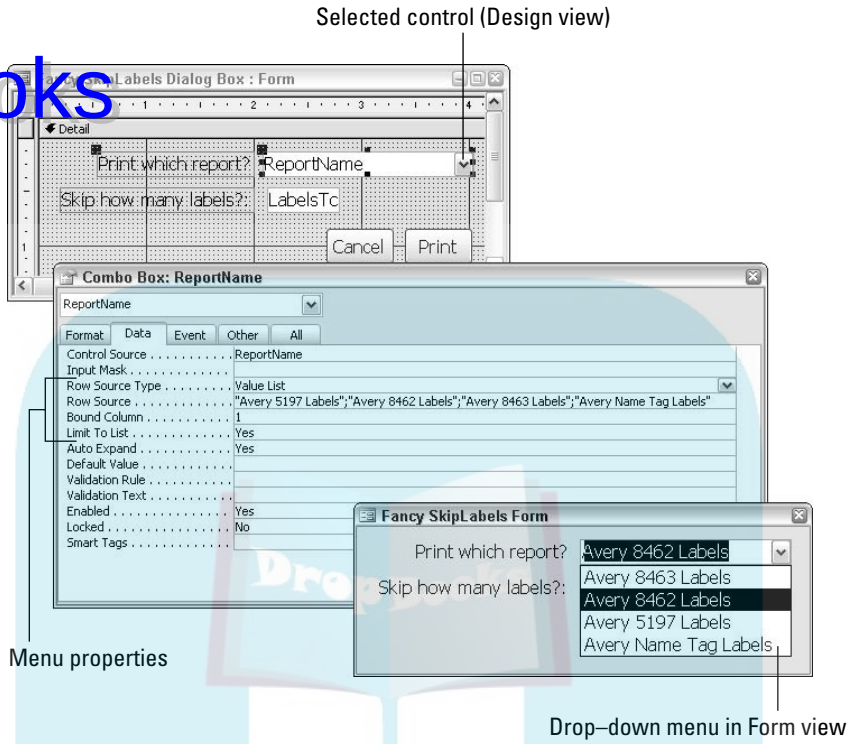

Figure 9-7: The `Report Name` control as a combo box.

The drop-down menu in the example shown above is *static:* It never changes. If you add, delete, or rename reports, those changes won't automatically be reflected in the drop-down menu. To get the drop-down list to work correctly, you need to open the form in Design view and manually change the Value List property from the drop-down menu to reflect current report names.

An easier approach would be to make the drop-down list *dynamic* so that each time the form opens, VBA can build an accurate, up-to-date list of valid report names for the combo box. That way, the drop-down list will always work even if you add, change, or delete reports, or even drop the whole chunk of code into an entirely separate database.

The `CurrentProject.AllReports` collection in VBA contains the names of all reports in the current database. If you want the drop-down list to show the names of all reports each time the form opens, you need some sort of code that builds the combo box's Value List from those report names. You also need to attach that code to the form's `On Load` event, which is triggered each time the form opens and displays any data from its underlying table or query.

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In this example, assume that the form is named and the control for which you want to build the Value List is named `ReportName`. The first step is to open `Fancy SkipLabels Form` in Design view and get to its Properties sheet. Choose Form from the Properties sheet's drop-down menu so you're setting properties for the form as a whole. Then click the Event tab, click On Load Event, click the Build button, click Code Builder, and then click OK. The VBA editor opens with the cursor inside an event procedure named `Form_Load()`, as follows:

```
Private Sub Form_Load()

End Sub
```

Any code that you place inside that procedure will execute each time the form opens. In this case, you want that code to loop through the `AllReports` collection, building a string of report names separated by semicolons that you can use as the `ValueList` for the `ReportName` drop-menu. The following code creates that semicolon-delimited list of report names from all reports in the current database:

```
Private Sub Form_Load()
   'ValueList variable will store a string that can
   'be used as the Value List property for a combo box.
   Dim ValueList As String
   ValueList = ""

   'Loop through all report names.
   For Each AccessObject In CurrentProject.AllReports
      'Add current report name and semicolon to ValueList variable.
      ValueList = ValueList + Chr(34) + AccessObject.Name + Chr(34) + ";"
   Next

   'Now make ValueList the Value List for the ReportName combo box.
   Debug.Print ValueList
   ReportName.RowSource = ValueList
   ReportName.Requery
End Sub
```

Take a moment to see how that works. The `For Each...Next` loop loops through each report in the database's `Reports` collection. For each report, it adds a quotation mark (specified as `Chr(34)` in the code), the report name, another quotation mark, and a semicolon.

Every character on your keyboard has an ASCII number assigned to it. For example, a double-quotation mark is character number `34`. A single quotation mark is character number `39`. Using `Chr(34)` in code tells VBA to insert a double-quotation mark in place of `Chr(34)`.

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So with each pass through the loop, the variable named `ValueList` gets another report name enclosed in quotation marks, followed by a semicolon. As written, the loop just adds every report name to the `ValueList` variable. Skipping back to the report names shown in Figure 9-6, by the time the loop has looked at every report name in the database, the `ValueList` variable contains this:

```
"Avery 8463 Labels";"Avery 8462 Labels";"Avery 5197
          Labels";"Customer Directory";"Avery Name Tag
          Labels";"Vendor Directory";"Invoices and Receipts
          Rpt";"Sales Tax Due Rpt";"LabelsTempReport";
```

The next lines

```
ReportName.RowSource = ValueList
ReportName.Requery
```

change the `ReportName` control's `RowSource` property to that new `ValueList` variable. The `ReportName.Requery` statement just makes sure that the form is aware of the change so that the combo box always shows the correct names. By the time the procedure has run, in this example, the `ReportName` combo box drop-down menu would contain these options:

- Avery 8463 Labels
- Avery 8462 Labels
- Avery 5197 Labels
- Customer Directory
- Avery Name Tag Labels
- Vendor Directory
- Invoices and Receipts Rpt
- Sales Tax Due Rpt
- LabelsTempReport

There are a couple of little problems here. For one, not all of these reports print mailing labels, so not all of the report names are really appropriate for the `SkipLabels` procedure. Also, `LabelsTempReport` isn't really a valid report name: It's just a temporary report name created by the `SkipLabels` procedure.

If you want to exclude `LabelsTempReport` from the drop-down list, you need to modify the code so that name isn't added to the `ValueList` variable. The necessary lines to be added are shown here in boldface:

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```
Dim ValueList As String
ValueList = ""
'Loop through all report names.
For Each AccessObject In CurrentProject.AllReports
   'Don't add LabelsTempReport to drop-down menu.
   If Not AccessObject.Name = "LabelsTempReport" Then
      'Add current report name and semicolon to ValueList variable.
      ValueList = ValueList + Chr(34) + AccessObject.Name + Chr(34) + ";"
   End If
Next

'Now make ValueList the Value List for the ReportName combo box.
ReportName.RowSource = ValueList
ReportName.Requery
```

By the time all the preceding code is executed, the `ValueList` for the `ReportName` control contains all report names except `LabelsTempReport`, which got skipped over by the statement

```
If Not AccessObject.Name = "LabelsTempReport"...
```

You can narrow the list of report names to just those reports that can print labels, but you need some means of being able to tell those reports apart from other ones. For example, suppose I make the rule *Any report in this database that prints labels must have the word* label *in its name.* If I make that rule and stick to it, I can rewrite the preceding code so that only reports with the word *label* in the name are added to `ValueList`, as shown in boldface here:

```
'ValueList variable will store a string that can
'be used as the Value List property for a combo box.
Dim ValueList As String
ValueList = ""

'Loop through all report names.
For Each AccessObject In CurrentProject.AllReports
   'Don't add LabelsTempReport to the Value List.
   If Not AccessObject.Name = "LabelsTempReport" Then
      'Only add report names that contain the word "label".
      If InStr(AccessObject.Name, "Labels") > 1 Then
         'Add current report name and semicolon to ValueList variable.
         ValueList = ValueList + Chr(34) + _
         AccessObject.Name + Chr(34) + ";"
      End If
   End If
Next

'Now make ValueList the Value List for the ReportName combo box.
ReportName.RowSource = ValueList
ReportName.Requery
```

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Excluding `LabelsTempReport` and any other reports that don't have the word *label* in their names creates the following string in the `ValueList` variable and ultimately in the `ValueList` property of the `ReportName` combo box. Hence, the `ValueList` string ends up containing

```
"Avery 8463 Labels";"Avery 8462 Labels";"Avery 5197 Labels";
            "Avery Name Tag Labels";
```

which means that the drop-down menu for the `ReportName` combo box ends up containing these options:

- Avery 8463 Labels
- Avery 8462 Labels
- Avery 5197 Labels
- Avery Name Tag Labels

Listing 9-1 shows the complete procedure with the ability to build the list of report names from only those reports that have the word *label* in their name, excluding the report named `LabelsTempTable`.

Listing 9-1: Building a List of Report Names

```
Private Sub Form_Load()
   'ValueList variable will store a string that can
   'be used as the Value List property for a combo box
   Dim ValueList As String
   ValueList = ""

   'Loop through all report names.
   For Each AccessObject In CurrentProject.AllReports
      'Don't add LabelsTempReport to the ValueList.
      If Not AccessObject.Name = "LabelsTempReport" Then
         'Only add report names that contain the word "label".
         If InStr(AccessObject.Name, "Labels") > 1 Then
            'Add current report name and semicolon to ValueList variable.
            ValueList = ValueList + Chr(34) + _
            Access Object.Name + Chr(34) + ";"
         End If
      End If
   Next

   'Now make ValueList the Value List for the ReportName combo box.
   ReportName.RowSource = ValueList
   ReportName.Requery
End Sub
```

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You don't have to rewrite all this code yourself. You can download `Fancy Skip Labels Form` and all the code shown in this chapter from `www.coolnerds.com/vba`.

The main point to glean from this example, though, is that the drop-down menu for a combo box need not be set in concrete. With VBA, you can customize the drop-down menu as needed by changing the control's `.RowSource` property. In this example, the code to build the `ReportName` drop-down list is executed each time `Fancy SkipLabels Form` opens. Hence, if any reports have been added, renamed, or deleted since the last time the form opened, the drop-down list will still accurately reflect the names of all reports in the current database that contain the word *label*.

If you import `Fancy SkipLabels Form` into an existing database, the drop-down list will automatically display all report names that contain the word *label* (excluding `LabelsTempReport`) in that database. Of course, if that other database didn't follow the rule of including the word *label* in all label reports, the procedure as it stands wouldn't work. You'd need to either rename reports in that database to follow the rule (which could be disastrous for any existing macro or code that refers to existing report names). Or you could make copies of all existing label reports, renaming the copies to include the word *label*.

If you already have some other means of uniquely identifying label reports in your database, you can change the rule in the code accordingly. For example, if all the label reports contain the word *Avery,* you can change the inner `If . . . End If` block to exclude report names that don't contain the word *Avery,* as below:

```
'Only add report names that contain the name "Avery".
If InStr(AccessObject.Name, "Avery") > 1 Then
   'Add report name and semicolon to ValueList variable.
   ValueList = ValueList + Chr(34) + _
   AccessObject.Name + Chr(34) + ";"
End If
```

The `Form_Load()` procedure executes as soon as you open the form. To fully test the form after creating or changing the `Form_OnLoad()` event procedure, close and save the form first. Then open it in Form view from the database window.

Creating a Spin Box Control

Many Windows dialog boxes offer a *spin box* control that lets you change a number without typing. Oddly enough, there is no spin box control in the form's Design Toolbox to let you create such a control on your Access forms.

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If you want to add a spin box control to an Access form, you have to fudge it. Writing the code for the spin buttons is easy; creating the little buttons is the real challenge.

I've used numerous techniques to create the spin buttons. I've imported ActiveX controls, used command buttons with a special character like an up or down arrow, and even used transparent-background GIFs to put a tiny arrow on each command button. Because the spin buttons are so tiny, though, getting the command button to look right is difficult.

I finally just gave in and drew each button as a tiny graphic image. (It really doesn't matter whether you use a command button or a picture for the spin button because buttons and pictures both have `On Click` events to which you can tie code.) Figure 9-8 shows buttons that I drew for this example magnified 800 percent in Paint Shop Pro. The lower half of that same picture shows the buttons in place on a form. To get the buttons onto the form, I just used the standard Insert➪Picture commands on the Access menu bar in forms Design.

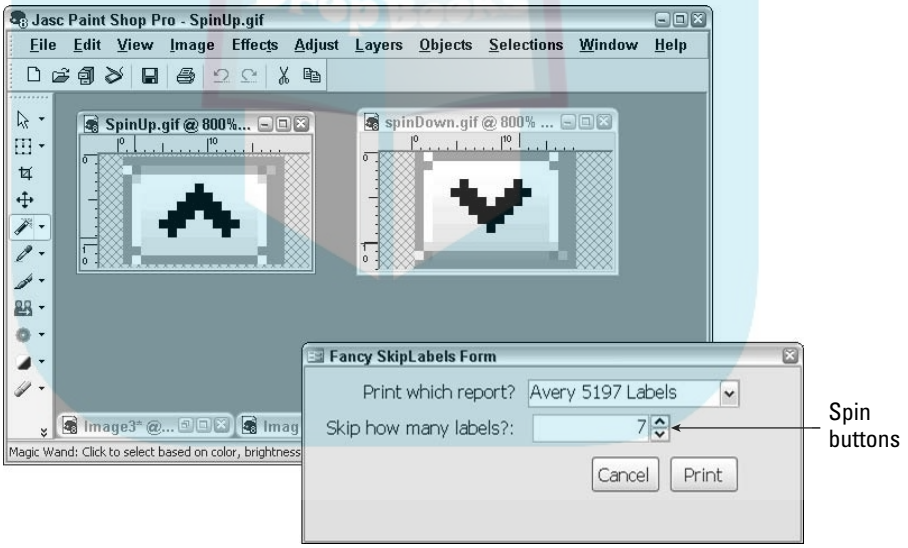

Figure 9-8: Spin button images in a program (top) and on a form (bottom).

I'll post some spin buttons at `www.coolnerds.com/vba` that you can download and use on your own forms.

Regardless of whether you use command buttons to pictures to get spin buttons onto a form, getting them to work is the same. You can name each button as you would any other control (via the `Name` property on the All tab of the Properties sheet). I named my two picture buttons `SpinUpBttn` and `SpinDownBttn`.

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After you have the controls on the form in Design view, click the Spin Up button control, click Events in the Properties sheet, click the On Click event, click the Code button, and then choose Code Builder. The VBA editor opens with the cursor already in a procedure named `SpinUpBttn_Click()` (assuming that you named your spin up button `SpinUp`). In my example, I want each click of the Spin Up button to increase the value in the `LabelsToSkip` control by 1.

Use an `If...Then...End If` statement to put an upper limit on how high the value can go. I chose 80 as an upper limit (because I doubt there are many label sheets that offer more than 80 labels per page), but you can set your upper limit to any value you want. Following is the code to increase the value in the `LabelsToSkip` control each time a user clicks the form's `SpinUpBttn` control:

```
Private Sub SpinUpBttn_Click()
   'Increase LabelsToSkip by 1 to a maximum of 80.
   If Me!LabelsToSkip.Value < 80 Then
      Me!LabelsToSkip.value = Me.LabelsToSkip.Value+1
   End If
End Sub
```

After writing the code for the `SpinUpBttn` and returning to your form in forms Design, click the `SpinDownBttn` control on your form. Again, get to that control's `On Click` event in the Properties sheet and write a routine like the one that follows. In that example, I put a lower limit of 0 (zero) on the value in the `LabelsToSkip` control:

```
Private Sub SpinDownBttn_Click()
   'Decrease LabelsToSkip by 1 to a minimum of 0.
   If Me!LabelsToSkip.Value > 0 Then
      Me!LabelsToSkip.value = Me.LabelsToSkip.Value-1
   End If
End Sub
```

The following code shows both procedures in place in the class module for my `Fancy SkipLabels` dialog box example. Again, the biggest trick to getting spin buttons on a form is getting buttons that are small enough to fit next to the control. But after you have a command button or picture in place, you can program its `On Click` event to increase or decrease the value in a numeric field by one with each click.

```
Private Sub SpinDownBttn_Click()
    'Decrease LabelsToSkip by 1 to a minimum of 0.
    'If Me!LabelsToSkip.Value > 0 Then
        Me!LabelsToSkip.Value = Me.LabelsToSkipValue - 1
    End If
End Sub
```

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```
Private Sub SpinUpBttn_Click()
    'Increase LabelsToSkip by 1 to a maximum of 80.
    If Me!LabelsToSkip.Value < 80 Then
        Me!LabelsToSkip.Value = Me.LabelsToSkip.Value + 1
    End If
End Sub
```

Detecting a Right-Click

You might have noticed that just about every control has an `On Click` event to which you can tie code. The `On Click` event occurs only when the user points to the item and then presses and releases the left mouse button. There is no `On Right-Click` event that you can use to detect whether the user right-clicks an item.

If you want to write different code for different types of clicks, you have to use the `On MouseDown` event. When you click an object's `On MouseDown` event in the Properties sheet and choose the Code Builder, the procedure created will look something like this (where *`objectName`* is the name of the object to which you're tying the code):

```
Private Sub objectName_MouseDown _
    (Button As Integer, _
    Shift As Integer, X As Single, _
    Y As Single)

End Sub
```

The arguments that get passed automatically to the procedure are listed as follows:

- *`Button`*: Returns a number or constant indicating which mouse button the user pressed.
  - Left mouse button: `Button` argument contains `acLeftButton`.
  - Middle mouse button (or mouse wheel): `Button` contains `acMiddleButton`.
  - Right mouse button: `Button` contains `acRightButton`.
- *`Shift`*: Returns a constant indicating whether the user held down the Shift, Alt, or Ctrl key while pressing the mouse button. Possible values for Shift include
  - `acShiftMask`: The Shift key was held down.
  - `acCtrlMask`: The Ctrl key was held down.
  - `acAltMask`: The Alt key was held down.

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- *X*: Returns a number indicating the horizontal position of the mouse pointer.
- *Y*: Returns a number indicating the vertical position of the mouse pointer.

In your procedure, you can `If...Then...End If` statements to write different code for different mouse activities. For example, the Listing 9-2 shows the basic skeletal structure that responds differently to a left, middle, or right mouse click:

Listing 9-2: Skeletal Structure of Code to Distinguish between Left and Right Mouse Clicks

```
Private Sub ObjectName_MouseDown(Button As Integer, _
   Shift As Integer, X As Single, _
   Y As Single)

   'Code for left mouse button.
   If Button = acLeftButton Then
      'Code to execute for left button goes here.
      MsgBox "You pressed the Left mouse button"
   End If

   'Code for right mouse button.
   If Button = acRightButton Then
      'Code to execute for left button goes here.
      MsgBox "You pressed the Right mouse button"
   End If

   'Code for middle mouse button.
   If Button = acMiddleButton Then
      'Code to execute for middle button goes here.
      MsgBox "You pressed the Middle mouse button"
   End If

End Sub
```

As it stands, the sample procedure just provides a little message onscreen indicating which mouse button you pressed. In your actual code, you'd replace the `MsgBox` statements with the VBA code that you want to execute after the left, middle, or right mouse click.

In the next chapter, I dig deeper into the whole topic of creating custom drop-down menus and lists using VBA code. The techniques that you can see there apply to any form that you create, whether that form is a dialog box or just a regular Access form for scrolling through table records.

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Chapter 10

Customizing Lists and Drop-Down Menus

In This Chapter

- Programming combo boxes and list boxes
- Linking lists
- Updating one form's control from another form
- Cool combo box tricks

Typing information into forms takes time, and typing always means the possibility of typographical errors. Any time you can eliminate typing by giving the user something to click, you're making your data entry quicker and more accurate.

Combo boxes and list boxes are both good tools for giving the user options to choose from when typing would otherwise be necessary. A *combo box* is basically a text box with a drop-down arrow on the right, as in the left side of Figure 10-1. The options available to the user — also shown at the left side of Figure 10-1 — aren't visible until he or she clicks the drop-down arrow. The user can either type in the text box or choose an option from the drop-down menu.

The right side of Figure 10-1 shows an example of a list box. Like a combo box, the list box shows a list of options, but there's no hidden drop-down menu: The list (or at least some portion of it) is plainly visible. Also, with a list box, there's no place to type text. The user has to choose an option from the list by clicking it. The selected option is highlighted in the control.

Because both combo and list boxes display a list of options onscreen, they have many similar properties. For example, every combo box and list box has a `Row Source` property that defines where the list of options comes from. When you use the Control Wizards to create a combo or list box, the wizard sets the `Row Source` property according to how you answer its questions. In forms Design, you can set the `Row Source` property via the Properties sheet. From VBA, you can change the `Row Source` property by using the `.RowSource` keyword.

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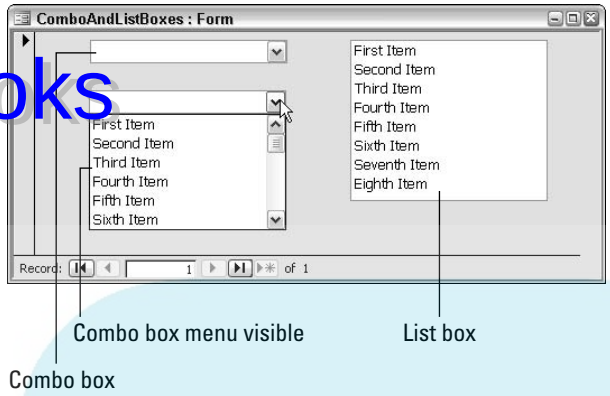

Figure 10-1: Sample combo box and list box.

Programming Combo and List Boxes

When working with combo and list boxes through VBA, you'll often want to start with just a simple *unbound control* (one that's not attached to any field in the form's underlying table or query) and then let VBA control the properties.

To add an unbound `ComboBox` or a `ListBox` control to a form, first make sure that the form is open in Design view and that the Toolbox (see Figure 10-2) is open. To prevent the Control Wizards from helping you create the control, click the wizard's button until it's no longer lit. Then follow these steps:

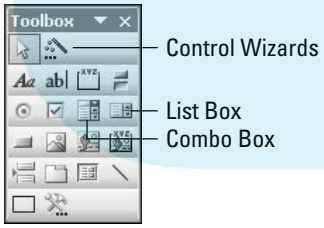

Figure 10-2: Toolbox Control Wizards, List Box, and Combo Box buttons.

1. **In the Toolbox, click either the Combo Box or List Box tool, depending on which you want to create.**

   If it's hard to tell one button from the other in the Toolbox, just point to any button in the Toolbox to see its name next to the mouse pointer.

2. **In the form, click at about where you want the left edge of the control to appear.**

3. **If the wizard appears and you don't want to use it, click the Cancel button in the wizard.**

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After the combo box or list box is on your form, you can view its properties in the Properties sheet. As always, if the Properties sheet isn't already open, you can press F4 or right-click the control and choose Properties.

Like all controls, combo boxes and list boxes have lots of properties. The ones that you're most likely to refer to from VBA are summarized in the following list. The first name (bold) is the property name as it appears in the Properties sheet; the following name in parentheses is the name of the property as written in VBA.

- **Name** (`.Name`)**:** Defines the name of the control.
- **Row Source Type** (`.RowSourceType`)**:** Specifies where the list gets its data: from records in a Table/Query, from a simple Value List typed into the `Row Source` property, or a field list of field names from a table or query.
- **Row Source** (`.RowSource`)**:** Depending on the Row Source Type, this can be a SQL statement that gets data from a table or query, a typed list of options, or the name of a table or query.
- **Default Value** (`.DefaultValue`)**:** The item that's automatically selected when the form first opens.
- **List Rows** (`.ListRows`)**:** (Combo box only) The number of items to shown in the drop-down menu.
- **List Width** (`.ListWidth`)**:** (Combo box only) The width of the drop-down menu. If Auto, the drop-down menu width is equal in width to the `ComboBox` control.
- **Limit to List** (`.LimitToList`)**:** (Combo box only) If Yes, the user's entry in the combo box must match an item in its drop-down menu. Otherwise, whatever the user typed is rejected as an invalid entry.
- **Value** (`.Value`)**:** The value currently contained within the control.

To name a control on a form, first click the control to select it. Then click the All tab in the Properties sheet. Set the Name property at the top of the All tab to whatever you want to name your control.

In addition to the properties from the Properties sheet, VBA has an `Item Data(`*x*`)` property (where *x* is a number) that lets you refer to each item in the list by its position in the list. The first item is always zero (`0`), so the first item in the list can be referred to as `ItemData(0)`, the next item is `ItemData(1)`, and then `ItemData(2)` on down to the end of the list.

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A list box doesn't have a `List Rows` or `List Width` property because there is no drop-down list in a list box. The width and height of the `ListBox` control, as a whole, determine the width and length of the list. There is no `Limit To List` property for a list box because there is no optional text box in which the user could type a value. With a list box, the user is always required to choose an option in the list.

Combo boxes and list boxes are both examples of list controls (in that they show some sort of list to the user). After the preceding quick peek at some commonly used properties of those controls, read on to take a look at how you work those pups.

In forms Design, you can easily change a text box to a combo box to a list box or whatever. Just right-click the control that you want to change and then choose Change To➪*xx* (the type of control you want).

Listing field names

If you want a list box or combo box to list the names of fields in a table or query, set the control's `Row Source Type` property to `Field List` and set its `Row Source` property to the name of the table or query that contains the fields whose names you want to list.

For example, Figure 10-3 shows a `ComboBox` control named `FldNameCombo` on a form. As you can see in the Properties sheet, its Row Source Type is set to `Field List`, and its Row Source is set to `Customers`. The names in the control's drop-down menu (CustID, FirstName, LastName, and so forth) are field names from a table named `Customers`.

From a VBA standpoint, if you want the `FldNamesCombo` control to show field names from a different table or query in response to some event, change the control's `.RowSource` property to the name of the table or query from which you want the control to get field names. For example, this statement sets the Row Source property of the control named `FldNamesCombo` to a table named `Products` (so the control shows field names from the `Products` table):

```
Me!FldNamesCombo.RowSource = "Products"
```

The `Me!` in these examples refers to the form to which the control is attached and works only from a class module. From a standard module, `Me!` would have to be replaced with the full identifier for the open form — for example

```
Forms![EzQueryFrm]![FldNamesCombo].RowSource = "Products"
```

if the control is on an open form named `EZQueryFrm`.

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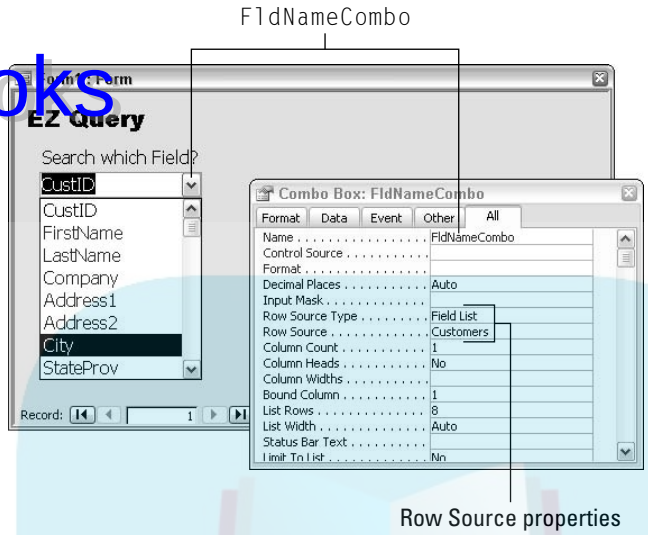

Figure 10-3: Row Source properties for a Field List combo box.

In your code, you can take extra steps to make sure that the control's Row Source Type is set correctly to `Field List` prior to putting in the new table name. After the field receives its new list, you can use the statement

```
Me!FldNamesCombo.Value = Me!FldNamesCombo.ItemData(0)
```

to set the selected option in a combo box to the first item in the drop-down list.

```
'Make sure the control's Row Source Type is Field List.
Me!FldNamesCombo.RowSourceType = "Field List"

'Change the Row Source table to Products table.
Me!FldNamesCombo.RowSource = "Products"

'Set selected combo box item to first item in drop-down menu.
Me!FldNamesCombo.Value = Me!FldNamesCombo.ItemData(0)
```

Using the keyword `Me!` in the preceding examples assumes that the code is in the class module for whatever form the `FldNamesCombo` control is on. To change the `FldNamesCombo` properties from a standard module or another form's class module, include the complete identifier for the open form. For example, if the `FldNamesCombo` control is on a form named `EZQueryFrm`, the complete identifier for the form is `Forms![EzQueryFrm]!` rather than `Me!` The complete identifier to the `FldNamesCombo` control is `Forms![EzQueryFrm]![FldNamesCombo]`.

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In code, you could spell out the complete identifier in each line of code, as follows:

```
'Make sure the control's Row Source Type is Field List.
Forms![EzQueryFrm]![FldNamesCombo].RowSourceType = "Field List"

'Change the Row Source table to Products table.
Forms![EzQueryFrm]![FldNamesCombo].RowSource = "Products"

'Set selected combo box item to first item in drop-down menu.
Forms![EzQueryFrm]![FldNamesCombo].Value _
    = Forms![EzQueryFrm]![FldNamesCombo].ItemData(0)
```

To avoid typing `Forms![EzQueryFrm]![FldNamesCombo]` repeatedly in your code, define a `Control` object variable that refers to the control through a shorter name.

```
'Make short name MyControl refer to
'Forms![EZQueryFrm]![FldNamesCombo]
Dim MyControl As Control
Set MyControl = Forms![EZQueryFrm]![FldNamesCombo]

'Make sure the control's Row Source Type is Field List.
MyControl.RowSourceType = "Field List"

'Change the Row Source table to Products table.
MyControl.RowSource = "Customers"

'Set selected combo box item to first item in drop-down menu.
MyControl.Value = MyControl.ItemData(0)
```

For example, the first line of the preceding code (`Dim MyControl As Control`) defines a new, empty `Control` object variable named `MyControl`. The second line

```
Set MyControl = Forms![EzQueryFrm]![FldNamesCombo]
```

makes the short name `MyControl` refer specifically to the control named `FldNamesCombo` on the form named `EZQueryFrm`. The lines that follow those two below are the same lines as in the preceding example except that they use the shorter name `MyControl` to refer to `Forms![EzQueryFrm]![FldNamesCombo]` (which makes the code a little easier to read).

The main point here though is that if you have a combo box or list box on a form, you can programmatically change the contents of the list (or drop-down menu) to show the field names from any table or query in the database. Now turn your attention to the second type of list — one that gets its values from a Value List.

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Listing text options

A combo box or list box can get its values from a simple string called a Value List. The string just contains each item in the list separated by semicolons. If the items in the list are all text, it's best to enclose each item in quotation marks.

For example, Figure 10-4 shows a combo box (named `OpsCombo`) added to a form. You can see the items in the open combo box: =, Like, <, >, and so forth. You can also see the properties for the control. Notice that the Row Source Type is Value List, and the Row Source is a bunch of little chunks of text enclosed in quotation marks and separated by semicolons. On the form, each little chunk of text is shown as an option on the control's drop-down menu.

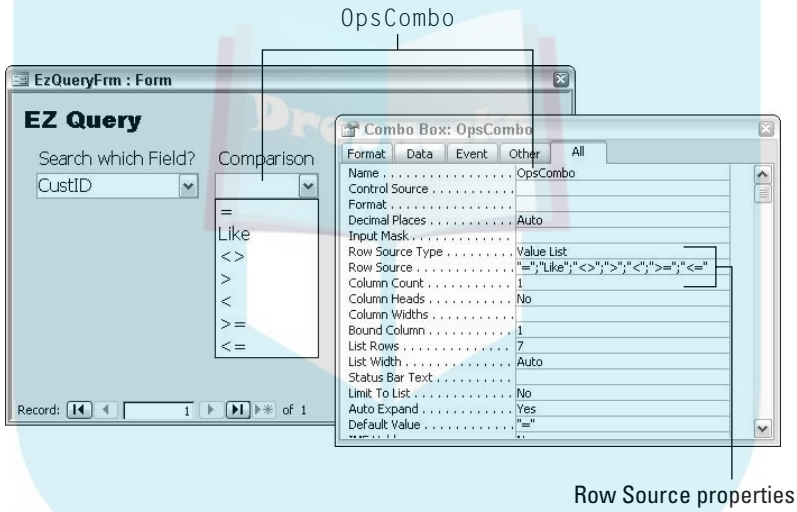

Figure 10-4: Row Source properties for a Value List.

The Row Source for the `OpsCombo` control is

```
"=";"Like";"<>";">";"<";">=";"<="
```

which is why the drop-down menu displays the various comparison operators. You can programmatically change the contents of a Value List combo or list by using the `RowSource` property. The new Row Source value must follow the rules of syntax, though, with each item separated by a semicolon and each string enclosed in quotation marks.

In code, you can represent a quotation mark as `Chr(34)` (the 34th ASCII character). That's generally easier that trying to add quotation marks by enclosing them in single quotation marks like `' " '`, which doesn't always work and is

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difficult to read. For example, Listing 10-1 declares a string variable named `NewValList` and then adds some text, quotation marks, and semicolons to that string.

Listing 10-1: Code to Fill a Combo Box Value List Property

```
'Create a string variable named NewValList
Dim NewValList As String

'Build NewValList string in chunks.
NewValList = Chr(34) + "First Item" + Chr(34) + ";"
NewValList = NewValList + Chr(34) + "Second Item" + Chr(34) + ";"
NewValList = NewValList + Chr(34) + "Third Item" + Chr(34) + ";"
NewValList = NewValList + Chr(34) + "Fourth Item" + Chr(34)
'At this point, NewValList contains...
'"First Item";"Second Item";"Third Item";"Fourth Item"

'Make new string the Row Source for value list named OpsCombo
Me!OpsCombo.RowSourceType = "Value List"
Me!OpsCombo.RowSource = NewValList
'Set selection to first item in drop-down menu.
Me.OpsCombo.Value = Me.OpsCombo.ItemData(0)
```

When you create a list box or combo box with its Row Source Type set to Value List, you can leave the Row Source property empty. When the form first opens, the list will also be empty, which means that the user can't select anything. However, you can write some code that fills the list and then attach it to the form's `On Load` event. This allows you to create dynamic, flexible lists that adapt themselves to the current database. I look at some examples in the sections that follow.

Make a list of table and query names

Sometimes you might want a combo box or list box to display a list of all the tables, or all the queries, or both. There isn't a simple property setting that will let you do that. You need to programmatically fill the list with names as soon as the form opens. Any time that you want code to execute as soon as a form opens, attach that code to the form's `On Load` event.

For example, Figure 10-5 shows an empty control named `TblQryCombo`. Its Row Source Type is set to Value List, but its Row Source property is empty. So without any code, when the form opens, `TblQryCombo` displays nothing.

Suppose now that when the form opens, you want it to display a list of all table names in the current database. You can write some code that loops through the `AllTables` collection and adds the name of each table to a string. Then use that string as the Row Source for the control.

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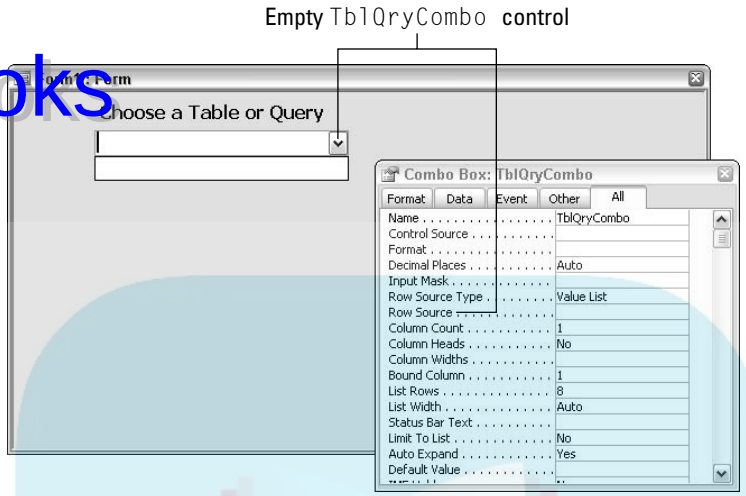

Figure 10-5: Sample empty combo box named `TblQryCombo`.

Note this catch, though. The `AllTables` collection includes hidden system tables that Access uses behind the scenes. Because the names of those system tables normally don't appear in the database window, you want to exclude them from the drop-down list as well.

Luckily, all the system tables have names that start with the letters `MSys`. To eliminate those table names from the drop-down list, you can use an `If...Else...End If` block to skip over any name that starts with `MSys`. The complete code to fill `TblQryCombo` with a list of table names as soon as the form opens is shown in Listing 10-2. Each comment refers to the line (or lines) that follow the comment.

Listing 10-2: Procedure to Create a Combo Box of Table Names

```
Private Sub Form_Load()
   'Declare an empty string to store a value list.
   Dim TblNames As String
   TblNames = ""

   'Loop through AllTables connection, add each table's
   'name to TblNames variable, each enclosed in quotation
   'marks and followed by a semicolon.
   Dim tbl As AccessObject
   For Each tbl In CurrentData.AllTables
      'Exclude system tables, whose names all start with Msys.
      If Not Left(tbl.Name, 4) = "Msys" Then
         TblNames = TblNames + Chr(34) + tbl.Name + Chr(34) + ";"
      End If
   Next tbl
```

(continued)

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Listing 10-2 *(continued)*

```
    'TblNames string now has all table names (except system tables).
    'Make it the Row Source for the TblQryCombo control.
    Me!TblQryCombo.RowSourceType = "Value List"
    Me!TblQryCombo.RowSource = TblNames

    'Show first item as selected item in control.
    Me!TblQryCombo.Value = Me!TblQryCombo.ItemData(0)
    'Make sure user can only select a valid name.
    Me!TblQryCombo.LimitToList = True
End Sub
```

If you want the combo box to show a list of all queries rather than all tables, you basically just have to change the word `AllTables` to `AllQueries` so that the loop gathers up names of queries rather than tables. Also, there are no system queries, so you wouldn't need the `If...Then...End If` block to exclude names that begin with `MSys`.

Taking it a step further, suppose you want the list to display the names of all tables and queries in the current database, with the word `Table:` in front of table names and the word `Query:` in front of query names. You need two loops in the form's `On Load` procedure: one to add the table names and one to add the query names. The entire procedure is shown in Listing 10-3.

Listing 10-3: Procedure to Create a Combo Box of Table and Query Names

```
Private Sub Form_Load()
    'Declare an empty string to store a value list.
    Dim TblNames As String
    TblNames = ""

    'To keep lines below short, we'll store the quotation mark
    'as a variable named QM, and just refer to it by
    'name (QM) in code that follows.
    Dim QM As String
    QM = Chr(34)

    'Loop through AllTables connection, add each table's
    'name to TblNames variable, each enclosed in quotation
    'marks and followed by a semicolon.
    Dim tbl As AccessObject
    For Each tbl In CurrentData.AllTables
        'Exclude MSys table names from list.
        If Not Left(tbl.Name, 4) = "MSys" Then
            TblNames = TblNames + QM + "Table: " + tbl.Name + QM + ";"
        End If
    Next tbl
```

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```
    'Next we loop through the AllQueries collection and add their names.
    Dim qry As AccessObject
    For Each qry In CurrentData.AllQueries
        TblNames = TblNames + QM + "Query: " + qry.Name + QM + ";"
    Next qry

    'TblNames string now has all table and query names.
    'Make it the Row Source for the TblQryCombo control.
    Me!TblQryCombo.RowSourceType = "Value List"
    Me!TblQryCombo.RowSource = TblNames

    'Show first item as selected item in control.
    Me!TblQryCombo.Value = Me!TblQryCombo.ItemData(0)
    'Make sure user can only select a valid name.
    Me!TblQryCombo.LimitToList = True
End Sub
```

Referring to the empty `TblQryCombo` control shown at the start of this section — and assuming that the code above is tied to that form's `On Load` event — by the time the form is visible to the user, the control will contain the names of all tables and queries in the current database, as in the example shown in Figure 10-6.

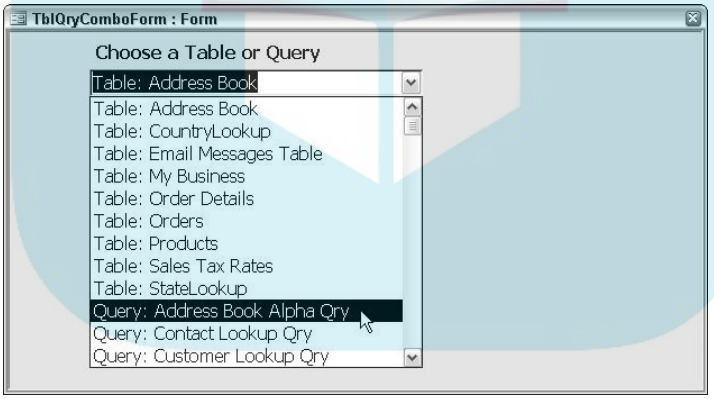

Figure 10-6: `TblQryCombo` control after `Form_Load()` procedure executes.

Make a list of form or report names

You can use a similar technique to Listing 10-2 to make a drop-down list display the names of all forms or all reports in the current database. For example, Figure 10-7 shows an empty `ComboBox` control named `ObjCombo` (for lack of a better name).

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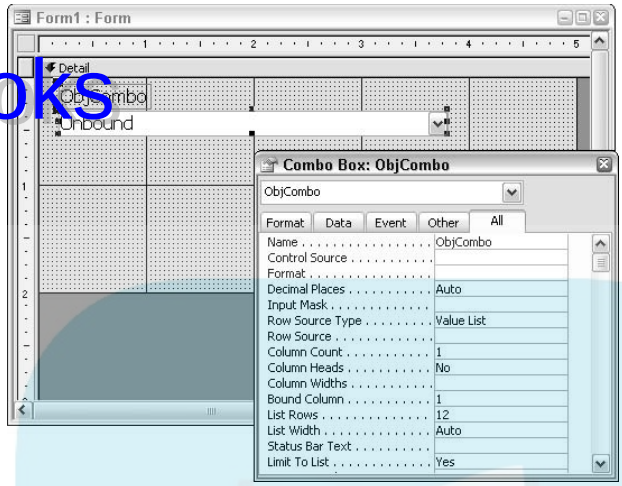

Figure 10-7: Sample combo box named `ObjCombo`.

To fill the `ObjCombo` with a list of all form names in the current database, tie the form's `On Load` event to a procedure that creates a value list of form names, as follows in Listing 10-4.

Listing 10-4: Code to Fill a Combo Box with Form Names

```
Private Sub Form_Load()
   'Define string variable to store new Value List.
   Dim NewValList As String
   NewValList = ""

   'Loop through collection and add each object name
   'with quotation marks and semicolons to NewValList.
   Dim obj As AccessObject
   For Each obj In CurrentProject.AllForms
      NewValList = NewValList + Chr(34) + obj.Name + Chr(34) + ";"
   Next obj

   'Now NewValList contains all object names in proper format.
   'Make that string the Row Source for objCombo control.
   Me!ObjCombo.RowSourceType = "Value List"
   Me!ObjCombo.RowSource = NewValList

   'Set option to first item in list.
   Me!ObjCombo.Value = Me!ObjCombo.ItemData(0)
End Sub
```

If you want that combo box to list all reports rather than all forms in the current database, change the code to loop through the `AllReports` collection rather than the `AllForms` collection. That just involves changing the collection name, as shown in boldface:

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```
Private Sub Form_Load()
   'Define string variable to store new Value List.
   Dim NewValList As String
   NewValList = ""

   'Loop through collection and add each object name
   'with quotation marks and semicolons to NewValList.
   Dim obj As AccessObject
   For Each obj In CurrentProject.AllReports
      NewValList = NewValList + Chr(34) + obj.Name + Chr(34) + ";"
   Next obj

   'Now NewValList contains all object names in proper format.
   'Make that string the Row Source for objCombo control.
   Me!ObjCombo.RowSourceType = "Value List"
   Me!ObjCombo.RowSource = NewValList

   'Set option to first item in list.
   Me!ObjCombo.Value = Me!ObjCombo.ItemData(0)
End Sub
```

The basic idea is still the same in all these examples. When the form opens, the form's `On Load` event occurs, which then triggers the code in the `Form_Load()` procedure, which in turn creates a valid, up-to-date list of object names to show in the list box or combo box.

Listing Table/Query field values

The third type of combo box/list box that you can create gets its values from a field (or fields) in a table or query. The Row Source Type for such a list is Table/Query, and the Row Source is generally a SQL statement that specifies which fields and values to show in the list. Back up a moment and take a look at the bigger picture.

Suppose you want to create a drop-down list that shows an alphabetized list of all unique Company names from a table. By *unique,* I mean that if a given company name appears more than once in the table, it still appears only once in the drop-down menu (or list box). To create such a query in Query Design, you'd need to add the field name to the Query-by-Example (QBE) grid and also choose Ascending as the Sort order. To prevent empty records from showing up in the query results, set a criterion to Is Not Null, as in the example shown in Figure 10-8.

To see the SQL view of a query on your own screen, right-click the query's title bar and choose SQL View. For more information, see the first few pages of Chapter 7.

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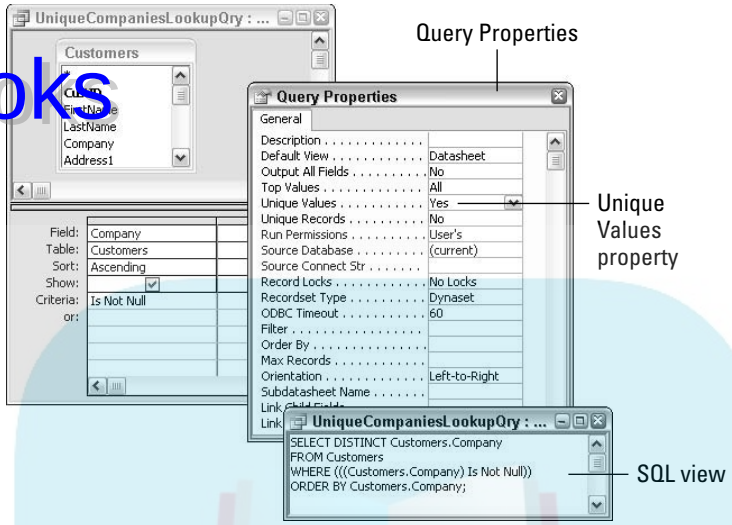

Figure 10-8: Sample unique values query for a text field.

To ensure that only unique addresses appear, you then need to double-click the gray area at the top of the query to open the Query Properties sheet. In the Query Properties sheet, set the Unique Values property to True, as in the example shown in Figure 10-8.

I also managed to sneak the SQL view of the same query into Figure 10-8. Like any SQL statement, it describes in words what the query is to do when opened. In this case, those words are

```
SELECT DISTINCT Customers.Company
FROM Customers
WHERE (((Customers.Company) Is Not Null))
ORDER BY Customers.Company;
```

The SQL statement says the same thing that the items in the QBE grid say, which is *Select unique Company names from the Customers table, excluding blanks (nulls), and put them in alphabetical order.*

The Unique Values property eliminates duplicate values within a single field. If a query contains multiple fields and you want only records with identical values in every field to be considered a duplicate, set the Unique Records property to `Yes` (or True). The SQL keyword for Unique Values is `DISTINCT`, and the SQL keyword for Unique Records is `DISTINCTROW`.

The SQL statement would work as the Row Source property for a `ListBox` or `ComboBox` control. In VBA, however, you'd probably prefer to use the following slightly different syntax, partly because you can omit all the parentheses

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and partly because the table name in front of the field name (for example, `Customer.Company`) is required only when the query involves two or more tables with identical field names. In the following syntax, *`tblName`* is the name of a table in the current database, and *`fldName`* is the name of any field within that table:

```
SELECT DISTINCT [fldName]
FROM [tblName]
WHERE [fldName] Is Not Null
ORDER BY [fldName]
```

For example, Figure 10-9 shows a `ComboBox` control named `SearchVal` with its drop-down menu already visible. That drop-down menu contains an alphabetized list of company names from a table named `Customers` because the control's Row Source Type is set to Table/Query, and its Row Source property is set to the SQL statement below (shown as one lengthy line within the property):

```
SELECT DISTINCT [Company] FROM Customers WHERE [Company] Is Not Null ORDER BY
              [Company];
```

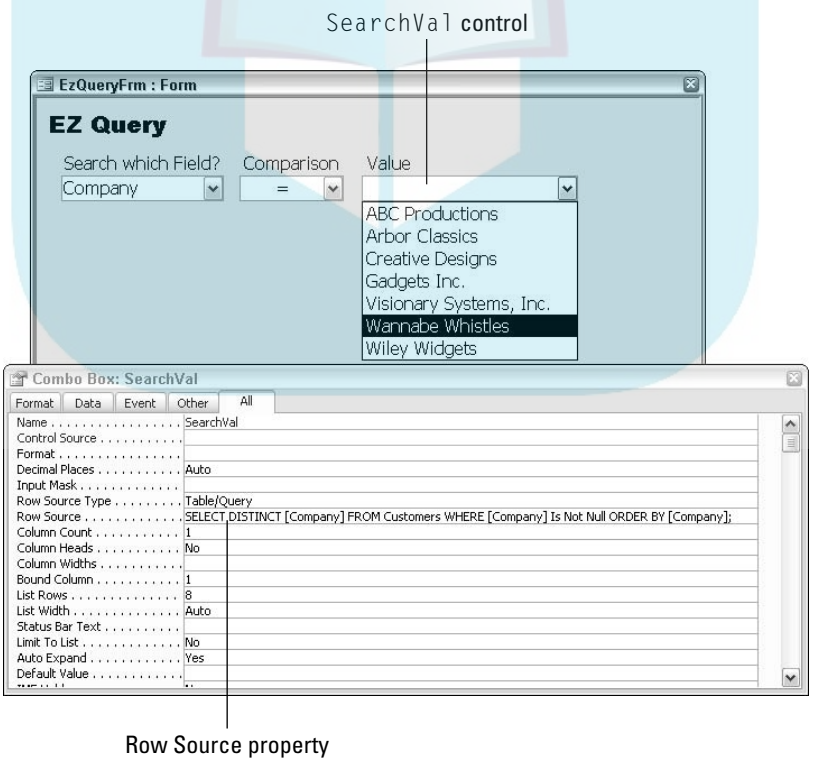

Figure 10-9: `SearchVal` is a `ComboBox` control.

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Now, suppose you want to programmatically change the SearchVal combo box so that it shows all unique ZIP codes from the Customers table. This example assumes that the Customers table stores ZIP codes in a field named ZipCode. But the idea is to create a new SQL statement that refers to the ZipCode field rather than the Company field, as follows. Then use that new SQL statement as the Row Source property for the SearchVal control.

```
'Create a string named MySql, and put a SQL statement in it.
Dim MySQL As String
MySQL = "SELECT DISTINCT [ZipCode] FROM [Customers]"
MySQL = MySQL + " WHERE [ZipCode] Is Not Null"
MySQL = MySQL + " ORDER BY [ZipCode]"

'Now MySQL contains a valid SQL statement. Use that SQK
'statement as the Row Source for the SearchVal control.
Me!SearchVal.RowSource = MySQL

'Make the first menu option the selected item in list.
Me!SearchVal.Value = Me.SearchVal.ItemData(0)
```

Even though the SQL statement is built in chunks in the code (just to make the lines short enough to fit inside these margins), the SQL statement that's created and stored in the MySQL variable is one long line of text composed of all the chunks. By the time the last MySQL = MySQL + . . . statement has executed, the MySQL variable contains

```
SELECT DISTINCT [ZipCode] FROM [Customers] WHERE [ZipCode] Is
            Not Null ORDER BY [ZipCode]
```

In the procedure, the statement Me!Search.Rowsource = MySQL puts the complete SQL statement into the Row Source property of the control. When the user clicks the drop-down button, the control shows all unique ZIP codes from the Customers table, as in Figure 10-10.

The bottom line here is that programmatically, you can do anything you want with a ListBox or ComboBox control. Like with anything you do through VBA, controlling when a combo box gets changed is a matter of choosing an appropriate event. Often the triggering event will be a change to some other control on the form or even a different form. In this way, you can control what appears in a combo or list box based on the contents of some other control, which brings me to linking lists.

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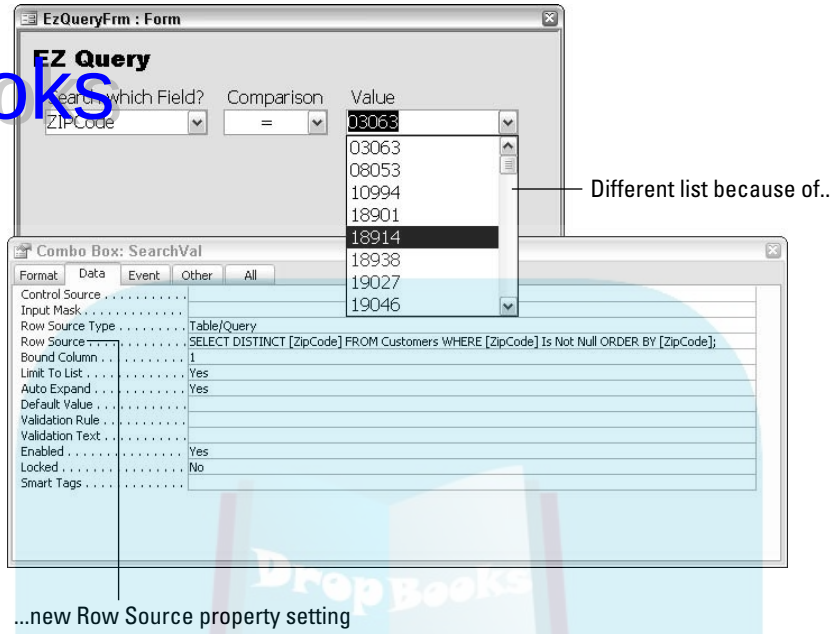

Figure 10-10: Result of changing a combo box's Row Source property.

Linking Lists

One of the main reasons for programming `ListBox` and `ComboBox` controls is to create *linked lists,* where the options in one control depend on what's selected in another control. As an example, Figure 10-11 shows a form named Fancy SkipLabels Dialog Box that contains three dynamic combo boxes named `LabelRpt`, `FldToSearch`, and `ValueToFind`. The fourth combo box (not pointed out) is *static,* meaning that its drop-down list never changes.

The names of the dynamic controls and the relationships between the control are summarized here:

- `LabelRpt`: This `ComboBox` lists names of all reports in the current database that contain the word *label.* It needs to be filled once — the moment when the form opens.
- `FldToSearch`: This `ComboBox` lists the names of fields from the selected report's underlying table or query. This needs to be updated each time the user chooses a report to print from the `LabelRpt` control.
- `ValueToFind`: This displays a list of all unique values in the field selected in the `FldToSearch` combo box. Each time the user chooses a field to search on, this combo box needs to be changed to display values from the selected field.

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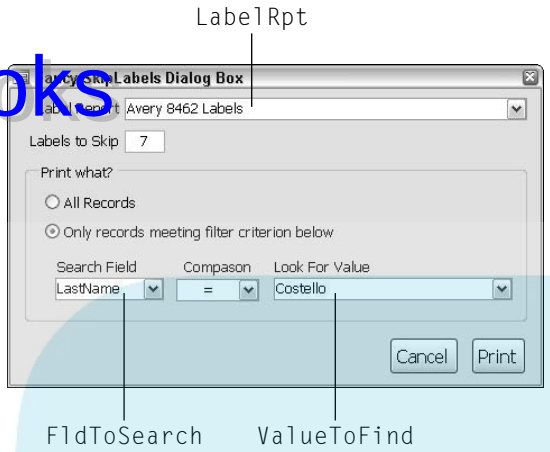

Figure 10-11: Fancy SkipLabels Form dynamic controls.

You can envision the relationships between the combo boxes as *dependencies,* in the sense that the exact items in a combo box depend on what's selected and available at the moment. For example, what appears in the `FldToSearch` combo box depends on what report is selected at the moment in `LabelRpt`. Similarly, what appears in the `ValueToFind` combo box depends on what field name is selected in the `FldToSearch` control. As is always the case, just writing the code to make these controls always show the "right stuff" is only part of the problem. You also have to control exactly *when* that code runs. Look at some examples of that first, which I'll follow with some of the code.

To make life simpler for myself, I encapsulated the code that updates each combo box as its own little procedure. The fancy programming term *encapsulation* translates to something along the lines of *Save myself from having to deal with this problem more than once.* For example, if I create a procedure named `UpdateFldToSeachCombo()` and make its job to ensure that the `FldToSearch` control is up-to-date, I don't have to worry about when the code gets executed. I can just tie the statement `UpdateFldToSeachCombo` to any event on any control in the form when I want that event to update the `FldToSearch` control.

That's sort of a programming strategy. To encapsulate the code needed to update each of the three dynamic controls shown in Figure 10-11, I wrote three separate procedures and named each so it describes what it does. The names of those procedures are

- `Sub UpdateLabelRptCombo()`: This procedure updates the list of reports in the `LabelRpt` combo box on the form to accurately reflect label reports in the current database.
- `Sub UpdateFldToSearchCombo()`: This procedure ensures that the `FldToSrch` combo box accurately reflects the names of fields in the

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selected report's record source. It allows the user to choose a field name on which to create a filter.

- `Sub UpdateValueToFindCombo()`: As its name suggests, this procedure ensures that the unique values displayed in the `ValueToFind` combo box accurately reflect the contents of the field specified in the `FldToSearch` control.

The advantage of creating these procedure is that I could just concentrate on getting each one to work (at all) without worrying about *when* the procedure will do its thing. In my code, when I want to tie the procedure to a particular event, the triggered procedure need only call the appropriate `Sub` procedure to get its job done. Again, I'll look at each procedure in a moment. Just focus on the *when* for a moment.

Running code when a form opens

If you want a procedure to execute as soon as a form opens and any data from the form's underlying table or query has been loaded into the form, tie a procedure to the forms `On Load` event. The name of that procedure, in every form, is `Form_Load()`. The `Form_Load()` procedure for the sample form shown in Figure 10-11 looks something like this:

```
Private Sub Form_Load()
   Call UpdateLabelRptCombo
   Call UpdateFldToSearchCombo
   Call UpdateValueToFindCombo
End Sub
```

In forms Design, make sure that the Properties sheet shows the word `Form` in the title bar and/or drop-down list. Clicking the gray area behind forms Design grid will instantly display Form properties in the Properties sheet.

The basic logic of the `Form_Load()` procedure is pretty straightforward: It simply updates each of the three `ComboBox` controls in the order that they need to be updated. When the form opens, each `ComboBox` control has actual, reasonable data in its drop-down menu.

Say the form is open, and the user chooses a report name from the LabelRpt drop-down menu. When that happens, the two controls beneath `LabelRpt` need to have their drop-down menus updated. First the FieldToSearch drop-down list needs to be updated to reflect field names from the selected reports record source (underlying table or query). Then after that control gets a new value, the ValueToFind drop-down menu needs to be updated to reflect legitimate values for the currently selected field name. To make that

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happen, a change to the LabelRpt control needs to run two of the update procedures. Here's the After Update procedure for the LabelsRpt control:

```
Private Sub LabelRpt_AfterUpdate()
    Call UpdateFldToSearchCombo
    Call UpdateValueToFindCombo
End Sub
```

The preceding procedure says, *After the user chooses a different report to print, update the FldToSearch and ValueToFind combo boxes on this form.*

Running code when the user makes a choice

To make a procedure execute after the user chooses an option from a combo or list box, tie the procedure to the control's After Update event. For example, when the user chooses to different field to search on from the Search Field option on the Fancy SkipLabels form (the FldToSearch control), the Look For Value drop-down menu needs to be updated to show unique values from that field. To make sure that the ValueToList control gets updated whenever the user chooses a different field to search, I added the following procedure to the form's class module:

```
Private Sub FldToSearch_AfterUpdate()
    Call UpdateValueToFindCombo
End Sub
```

The preceding class procedure says, *After the user chooses a different field to search on, update the Value to Find combo box to list unique values from the specified field.*

Getting Fancy SkipLabels

You can download the Fancy SkipLabels Dialog Box form and all its code from www.coolnerds.com/vba. You won't find any standard modules in that database. All the code for the Fancy SkipLabels Dialog Box will be in the form's class module. If you look at that code, you'll see more than just what's shown in this chapter. (That's because much of the code there isn't relevant to this chapter topic.)

To use Fancy SkipLabels Dialog Box in your own database, you first need to create at least one report for printing labels and also make sure you save that report with the word *label* in its name so SkipLabels will find the report. Then you need to import LabelSettingsTable and Fancy SkipLabels Dialog Box Form from the downloaded database into your own database. The Web site will provide more information.

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Getting back to the encapsulation strategy, you can see that it wouldn't be too tough to make other events on other controls update any dynamic list on the form. Just click the control, click its `After Update` event, and add the code needed to call the appropriate procedure(s) for the event.

The various preceding called procedures all follow the examples presented earlier in this chapter. For example, the `LabelRpt` control, which displays a drop-down menu of reports with the word *label* in their name, gets its information from the `AllReports` collection (Listing 10-5):

Listing 10-5: Code to Update a Combo Box of Report Names

```
'** UpdateLabelRptCombo() updates the LabelRpt control.
Private Sub UpdateLabelRptCombo()
   'ValListVar variable will store a string that can
   'be used as the Value List property for a combo box.
   Dim ValListVar As String
   ValListVar = ""

   'Get names of label reports from AllReports collection,
   'and assemble into a valid Value List for a Combo Box.
   Dim rpt As AccessObject
   For Each rpt In CurrentProject.AllReports
      'Don't add LabelsTempReport to the ValListVar.
      If Not rpt.Name = "LabelsTempReport" Then
         'Only add report names that contain the word "label".
         If InStr(rpt.Name, "Labels") > 1 Then
            'Add label report names to ValListVar.
            ValListVar = ValListVar + qt + rpt.Name + qt + ";"
         End If
      End If
   Next

   'ValListVar now contains valid report names, so next
   'lines make it the Row Source property for LabelRpt.
   Me!LabelRpt.RowSourceType = "Value List"
   Me!LabelRpt.RowSource = ValListVar
   'More code follows in actual procedure...
End Sub
```

The `UpdateFldToSearchCombo` procedure updates the drop-down menu in the `FldToSearch` control. The code gets the name of the label report to print from the `LabelRpt` control on the form (referred to as `Me!LabelRpt.Value` in the code). It then (invisibly) opens that report in Design view and copies its Record Source property (which is the name of the report's underlying table or query) into its own variable named `LabelRecSource`. After that, the rest of the code sets the controls Row Source Type to Field List and the Row Source to the name that's stored in that `LabelRecSource` variable. Here's the whole procedure with comments to help explain each step:

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```
'** UpdateFldToSearchCombo updates the FldToSearch Combo Box.
Private Sub UpdateFldToSearchCombo()

   'Open specified report in Design view.
   DoCmd.OpenReport Me!LabelRpt.Value, acViewDesign, , , acHidden

   'Copy its record source name to LabelRecSource variable.
   Dim LabelRecSource As String
   'Placeholder for record source.
   LabelRecSource = Reports(Reports.Count - 1).RecordSource

   'Close the report (only needed to grab record source).
   DoCmd.Close acReport, Me!LabelRpt.Value, acSaveNo

   'Set FldToSearch Combo Box Row Source properties.
   Me.FldToSearch.RowSourceType = "Field List"
   Me.FldToSearch.RowSource = LabelRecSource

End Sub
```

The last dynamic control on the form, `ValueToFind`, gets updated by a `Sub` procedure named `UpdateValueToFindCombo`. This procedure updates the list of unique values in the control's drop-down menu to accurately reflect unique values in whatever field the user specified in the `FldToSearch` control. The Row Source Type for the control needs to be Table/Query, and the Row Source has to be a valid SQL statement that specifies what to display. The code below builds a valid `SELECT DISTINCT...` query for whatever field's name is selected in `FldToSearch` control (`Me!FldToSearch.Value` in VBA). Listing 10-6 holds the whole procedure with comments.

Listing 10-6: Code to Update a Combo Box from a Table

```
Private Sub UpdateValueToFindCombo()
   'Build a SQL statement to pull unique values
   'from whatever field name is selected in form.
   '(If FldToSearch is empty, do nothing)
   If Not IsNull(Me!FldToSearch.Value) Then
      Dim MySQL As String
      MySQL = "SELECT DISTINCT " + FldToSearch.Value
      MySQL = MySQL + " FROM " + LabelRecSource
      MySQL = MySQL + " WHERE " + FldToSearch.Value + " Is Not Null"
      MySQL = MySQL + " ORDER BY " + FldToSearch.Value

      'Now that we have the right SQL statement, make it the
      'Row Source for the ValueToFind control.
      Me!ValueToFind.RowSourceType = "Table/Query"
      Me!ValueToFind.RowSource = MySQL
   End If
End Sub
```

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In case you're wondering about the `If Not IsNull(!FldToSearch.Value) Then...End If` statements, I originally wrote the procedure without those. At first, the procedure seemed to work fine when tested. But then I discovered that if the `FldToSearch` control is null (empty) when `UpdateValueTo FindCombo` is called, the procedure crashes and yelps out an error message. To ward off that irritant, I make execution of the code dependent on the `FldToSearch` control's not being null. In other words, the procedure executes only if there's a field name selected in the `FldToSearch` control. Otherwise, the procedure does nothing to prevent the error from occurring.

From a programming perspective, the main thing to remember is that every `ListBox` and `ComboBox` control that you create exposes many properties to VBA. Two of those properties, Row Source Type and Row Source, give you strong programmatic control over the choices presented by those controls.

Linking Lists across Forms

Working with list controls (such as `ListBox` and `ComboBox` controls) isn't always a matter of controlling the Row Source Type and Row Source properties of the control. In some cases, it's just getting the darn control to show what's currently in the underlying table or query. Or worse yet, getting it to accept a value that should be acceptable to the control — but isn't. These types of problems happen a lot when two or more forms are involved in the scenario.

I suppose a typical example would be where a user is trying to type in a new order, perhaps coming in over the phone. Say the user is sitting there looking only at the Orders form shown at the left side of Figure 10-12. To start typing in an order, she can choose an existing customer from the `CustID` combo box on the Orders form, or she can click New Customer (`NewCustBttn`) to enter name and address info for a new customer.

The names and e-mail addresses shown in these figures are all fake, so don't bother trying out any of the e-mail addresses to see whether they actually go anywhere.

If your user clicks the New Customer button, the NewCust form (also shown in Figure 10-12) opens at a blank record, ready to type in a new customer's info. Say the user types in the info and clicks the Done - Fill Order button (named `DoneBttn`). At that point, the NewCust form closes, and the user is returned to the Orders form. That moment in time — when the NewCust form closes and the focus returns to the Orders form — is where most troubles begin. The problem has to do with *when* a combo box or list box gets its data from an underlying table or query, which (in general) is only once — when the form opens.

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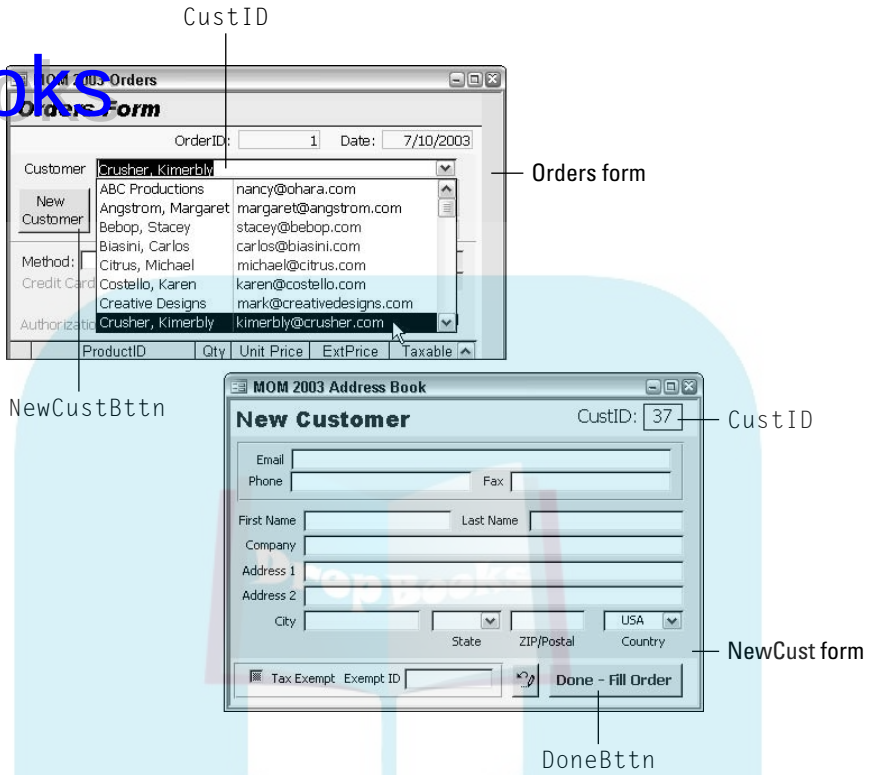

Figure 10-12: Sample Orders and NewCust forms open.

Updating a combo box or a list box

A typical combo box or list box gets the values that it shows in its list only once, right after the form opens. For example, the `CustID` control in the Orders form pictured earlier gets its list of customers from a field in a table named `Customers`. It gets that list when the Orders form opens. When a user adds a new record to the `Customers` table via the NewCust form, the `Orders` table knows nothing of the new record. The drop-down menu in the `CustID` control just continues to show the same names it did before NewCust form added a new record to the `Customers` table.

The solution to the problem is the `Requery` method, which every list box and combo box control exposes to VBA. As its name implies, the `Requery` method forces the list box or combo box to update its list (drop-down menu) immediately. The syntax for using the method is

```
controlName.Requery
```

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where *controlName* is the name of the combo box or list box that needs updating. When you need to update a control on some (for other than the one in which the code is running), you need a complete identifier at the start of the name, specifying the name of the form on which the control resides. For example, to update the CustID control in Orders form from code that's in the class module for the NewCust form (or any other form)

```
Forms![Orders]![CustID].Requery
```

The preceding statement says, *Update the control named CustID on the currently open form named Orders.*

Okay, back to the sample Orders and NewCust forms shown in Figure 10-12. First, clarify that the Orders form there is bound to a table named Orders. The CustID control on the Orders form is bound to the CustID control in the Orders table, which is a Long Integer. The CustID control on the NewCust form is bound to the CustID control in the Customers table, where it's defined as an AutoNumber field and Primary key (ensuring that every new customer automatically gets a unique, unchangeable CustID value the moment when a new record is added). Figure 10-13 shows the structures of the Orders and Customers tables.

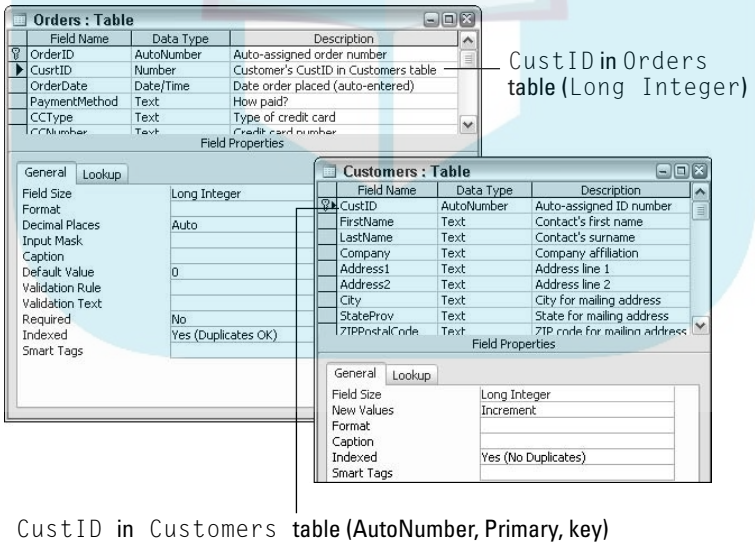

Figure 10-13: Tables underlying OrdersFrm and NewCust forms.

When you look at the CustID combo box in Figure 10-12, it doesn't look like it's bound to an Integer field in a table because the control displays text. However, the actual hidden value in that CustID control is an integer; the integer is just hidden from view. More on that in the upcoming section, "Hidden values in combo and list boxes."

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Suppose you have a form like the Orders form that has a button to add a new record through some other form. The first thing you need to do is get the button to open the appropriate form pointing at a new, blank record. Tackle that problem first.

Open a form to enter a new record

Say you have the Orders form open in Design view, and you need to get that New Customer button to open the NewCust form poised to accept a new record. You could do that with a macro, or you can assign the following procedure to New Customer button's (`NewCustBttn`) `On Click` event.

```
Private Sub NewCustBttn_Click()
   'Open NewCust form at new, blank record (asFormAdd).
   DoCmd.OpenForm "NewCust", acNormal, , , acFormAdd
End Sub
```

That's it for the Orders form's role in all of this, so you'd close and save that form. When the user clicks the New Customer button on the Orders form (in Form view), the NewCust form will open. Presumably, the user will then type in the new customer's information, click the Done button, and return to the Orders form. That's where the `CustID` control on the Orders form will get out of sync.

When the NewCust form closes and saves the new record, the `CustID` control on the Orders form won't know about the new record. Hence, its drop-down menu will be out of sync. Somehow you have to get the NewCust form to tell the Orders form, "Hey, update your `CustID` control" before the form closes.

To solve the problem, write some code that updates the `CustID` control on the Orders form every time the NewCust form adds a new record to the `Customers` table. As it turns out, any time a form adds a new record to its underlying table or query, that form's `On Insert` event occurs. Thus, a guaranteed way to ensure that the Orders form's `CustID` combo box is up-to-date is to requery that control every time the NewCust form's `On Insert` event occurs.

To make that happen, do the following:

1. **First make sure you open the NewCust form (not the Orders form) in Design view.**
2. **Make sure Form is selected in the Properties sheet (so you're setting Form properties).**
3. **Click the Event tab in the Properties sheet.**
4. **Click the Build button next to the After Insert event.**
5. **Choose Code.**

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6. **Click OK.**
7. **Type the VBA statement needed to requery the control on the Orders form:**

   Forms![Orders]![CustID].Requery.

The entire `Form_AfterUpdate` procedure in the NewCust form's class module looks like this:

```
Private Sub Form_AfterInsert()
   'Update CustID combo on open Orders form.
   Forms![Orders]![CustID].Requery
End Sub
```

The problem is now solved because every time the user adds a customer to the `Customers` table from the NewCust form, the `CustID` control on the Orders form will automatically be requeried to include that new record. You could leave it at that. However, in solving that problem, you created a new problem, as described next.

Seeing whether a form is open

VBA can requery a control only on a form that's open. If a form is closed, there's no way to (and no reason to) requery any of its controls because any list controls on the form will be created (and hence up-to-date) the moment when the form opens. If VBA code tries to requery a control on a form that's closed, the procedure crashes, and an error message appears onscreen. Not good.

To get around the problem of the `Form_AfterInsert()` procedure crashing when the Orders form isn't open, put the statement that updates the control inside an `If...End If` block. Make the condition of the `If` statement `CurrentProject.AllForms("FormName").IsLoaded` in your code but substitute `FormName` with the name of the form that needs to be open. For example, the following modified `Form_AfterUpdate()` procedure requeries the Orders form's `CustID` control only if the Orders form is open when the procedure executes:

```
Private Sub Form_AfterInsert()
   'If the Orders form is open (loaded...)
   If CurrentProject.AllForms("Orders").IsLoaded Then
      '...update CustID combo on open Orders form.
      Forms![Orders]![CustID].Requery
   End If
End Sub
```

If the Orders form is closed when the preceding procedure is executed, the procedure does absolutely nothing. That's good because as I mention, there's no need to requery a control on a closed form.

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Getting forms in sync

Requerying the `CustID` control on the Orders form keeps the combo box's drop-down list up-to-date with the current contents of the `Customers` table at all times. However, it doesn't change the value that's currently displayed in that control. In other words, requerying a `ComboBox` control fixes the combo box's hidden drop-down menu, but it doesn't change which option in that menu is currently selected and visible in the control. You can always add some code to take care of that.

A perfect example would be when the user adds a new customer via the NewCust form and returns to the Orders form. Ideally, you want the Orders form to already show a new, blank order form with the new customer already chosen as the one placing the order. So from a VBA perspective, when the user closes the NewCust form, it makes sense to add a new, blank record to the Orders form and set the `CustID` control on the Orders form to the new customer's `CustID` value. In other words, when the user clicks the Done - Fill Order button, you want VBA to

- Copy the new customer's `CustID` to a variable for holding
- Close the NewCust form, saving the new customer's record
- Make sure you're at new, blank record in Orders form
- Copy the new customer's `CustID` into Orders form's `CustID` control
- On the Orders form, put the cursor in whatever control the user is most likely to resume typing the order

Making those steps happen whenever someone clicks the `DoneBttn` button in the NewCust form requires the procedure in Listing 10-7 in the NewCust form's class module:

Listing 10-7: Code to Update a Control on a Separate Form

```
Private Sub DoneBttn_Click()

   'Do these steps only if Orders form is open.
   If CurrentProject.AllForms("Orders").IsLoaded Then

      'Copy the new customer's CustID to a variable.
      Dim NewCustID As Integer
      NewCustID = Me!CustID.Value

      'Close the NewCust form, saving new record.
      DoCmd.Close acForm, "NewCust", acSaveYes
```

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```
        'Make sure were at new, blank record in Orders form
        DoCmd.GoToRecord acDataForm, "Orders", acNewRec

        'Copy new CustID into Orders form's CustID control
        Forms![Orders]!CustID.Value = NewCustID

        'Move cursor to PaymentMethod control in Orders form.
        Forms![Orders]![PaymentMethod].SetFocus

    End If

End Sub
```

You might notice that none of the statements in the preceding procedure requeries the `CustID` control on the Orders form. That's because you've already written a `Form_AfterInsert()` procedure to ensure that any time any record gets added to Customers via the NewCust form, code immediately updates the `CustID` control on the Orders form. When VBA executes the statement `DoCmd.Close acForm, "NewCust", acSaveYes`, it has to save the current record (because of `acSaveYes`). Right after the form inserts the new record into the Customer table, the `Form_AfterInsert()` procedure runs, updating the CustID combo box on the Orders form.

In other words, by the time execution reaches the first statement under the `DoCmd.Close acForm, "NewCust", acSaveYes` statement, the `Form_AfterInsert()` event has already occurred and updated the `CustID` control on the Orders form to include the new customer's record.

More Combo Box Tricks

Here I look at a few more combo box tricks, starting with an explanation of why what you *see* in a combo box isn't always what you *get* in VBA. For example, the `CustID` control on the Orders form shown in Figure 10-12 is bound to a `Long Integer` field in its underlying table, and yet its combo box shows a bunch of names and addresses. How can that be?

Hidden values in combo and list boxes

A combo box or list box can show any data from a table or query even though the control contains some simple value like an `Integer`. The integer, which is usually a primary key value, can be hidden in the control as the control's actual value while some more meaningful (to humans) text is shown to the user.

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This disappearing value act works thanks to multicolumn lists and the Bound Column property. Here, in a nutshell, is how it works:

- Whatever is in the first column of the list is what *shows* (visibly) in the control.
- Whatever value is defined as the Bound Column is the value that's actually *stored* in the control, although not visible to the user.

For example, to create the drop-down menu of customer names and e-mail addresses shown back in the Orders form (refer to Figure 10-12), I first created a query based on the `Customers` table. In that query, I used some fancy expressions to display the name and e-mail address of each customer in the list. The first column in the query, as shown in Figure 10-14, contains the calculated field (which is too wide to show completely in the figure):

```
SortName: IIf(IsNull([LastName]),[Company],[LastName] & ", " & [FirstName])
```

The preceding expression says, *If the Last Name field in this record is null (empty), just show the Company name. Otherwise, show the person's* `LastName` *followed by a comma and a space and then the* `FirstName`.

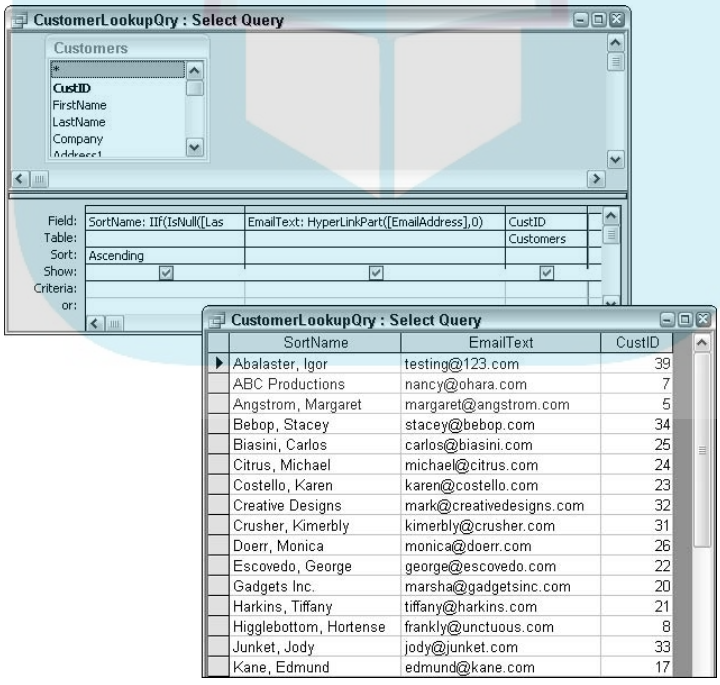

Figure 10-14: The `CustomerLookupQry` query in Design and Datasheet views.

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The second column in the query contains the calculated field:

```
EmailText: HyperLinkPart([EmailAddress],0)
```

In that example, `EmailAddress` refers to a Hyperlink field in the underlying Customers table. Hyperlink fields can look kind of weird in drop-down menus. The `HyperLinkPart()` function there isolates just the display portion of the field. That basically ensures that the e-mail address looks like an e-mail address in the query results.

The third column in the `CustomerLookupQry` contains represents the `CustID` control from the `Customers` table, which is defined as a AutoNumber field in the table's design. The lower-right image in Figure 10-14 is the same `CustomerLookupQry` in Datasheet view. Notice how the names are presented in the first column; the e-mail address in the third column; and the `CustID` value — an `Integer` — in the third column. Later, when you use that query as the drop-down menu for a combo box, you can make that third column the Bound Column while still showing the fancy `SortName` value in the control.

Say you create, close, and save a query like `CustomerLookupQry`. Now you want to use that query's columns as a drop-down menu for a combo box that allows the user to choose a customer by name and/or e-mail address. To get started, you need a form open in Design view. Optionally, you can turn on the Control Wizards by clicking the Control Wizards button in the Toolbox.

Next, create the combo box as you normally would. For example, to create the CustID combo box on the Orders form, you'd click the Combo Box tool in the toolbox and then drag the `CustID` control from the Orders table's Field List onto the form. (Dragging the `CustID` control to the form after you click the Combo Box tool binds the new combo box to the `CustID` control.)

When the Combo Box Wizard starts, just follow its instructions to design the combo box. For example, tell it to get its values from the `CustomerLookupQry` described earlier. When it asks which fields from that query to display, choose all three field names. When you get to the wizard page where you set column widths, you'll initially see all the columns from the query, as in the top-left side of Figure 10-15. To hide the CustID number from the user, narrow its column to the point that it's not visible. Set the widths of the other two columns to whatever fits best, as in the lower-right portion of that same figure.

The next page of the wizard asks which field from the query should actually be stored in the `ComboBox` control. In this case, you'd choose `CustID` because you want to store the selected customer's `CustID` value (not the name or e-mail address) in the CustID field of the Orders form. The last wizard page asks which field should store that value and suggests CustID. I click Next, and the last wizard page asks for a label. I type **Customers** and then click Finish.

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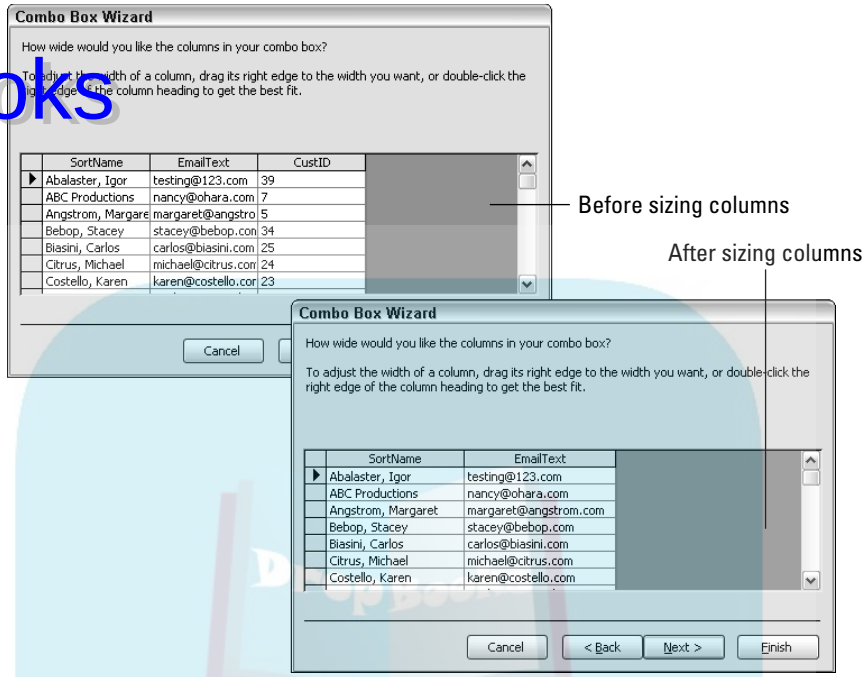

Figure 10-15: Column-sizing page of the Combo Box Wizard.

The `ComboBox` control is now on the form. Figure 10-16 shows the results with the Combo Box drop-down menu visible. You can also see the Properties sheet there, and that's where you can see what's really going on. For example, the Column Count property shows that the drop-down menu actually contains three columns. The Column Widths are 1.4", 1.6", and 0", meaning the third column is invisible (zero inches wide). The Bound Column property (`3`) tells you that whatever is in that third column is what actually gets stored in the `CustID` control that the drop-down menu is attached to.

Because a combo box always *shows* whatever is in the first column of the drop-down menu, only the selected person's name appears in the combo box after the user makes a selection because that `SortName` control is the fist column in the `CustomerLookupQry` query. The only purpose of the e-mail column in that query is to act as a tie-breaker. For example, if two customers happen to have the same first and last name, the user can tell which is which by the e-mail address.

The most important thing to glean from all of this is that what you see in a `ComboBox` control isn't always what Access and VBA see. What's actually *stored* in the combo box will be whatever is defined as the Combo Box's Bound

column. What you'll *see* in the control is whatever is in the first column of the drop-down menu.

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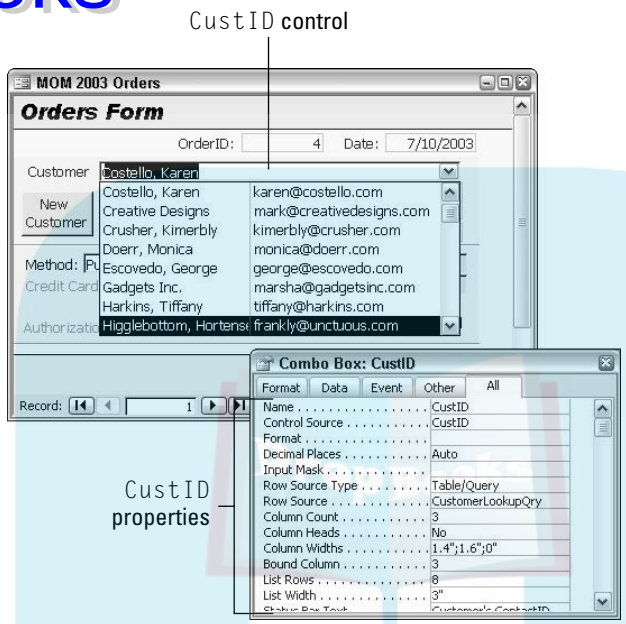

Figure 10-16: `CustID` control using `Customer Lookup Qry`'s columns.

If you add an unbound text box control to your form that contains an expression like `=fieldname.Value` as its control source (where *`fieldname`* is the name of a `ComboBox` or `ListBox` control), that control will show you the true value of the `fldname` control as opposed to what *appears* in the control.

Giving users a quick find

You can use a combo box as a tool for allowing a user to quickly find a specific record in a table. For example, suppose you have a form that allows a user to find and edit customers. At the top of that form, you could provide a drop-down menu, perhaps named *Quick Find* or something, as in Figure 10-17. When the user chooses a name from the drop-down menu, the form instantly displays that customer's record. (I also point out some of the properties for the `QuickFind` control in that figure.) You can assign those properties when you use the Control Wizards to create the initial combo box.

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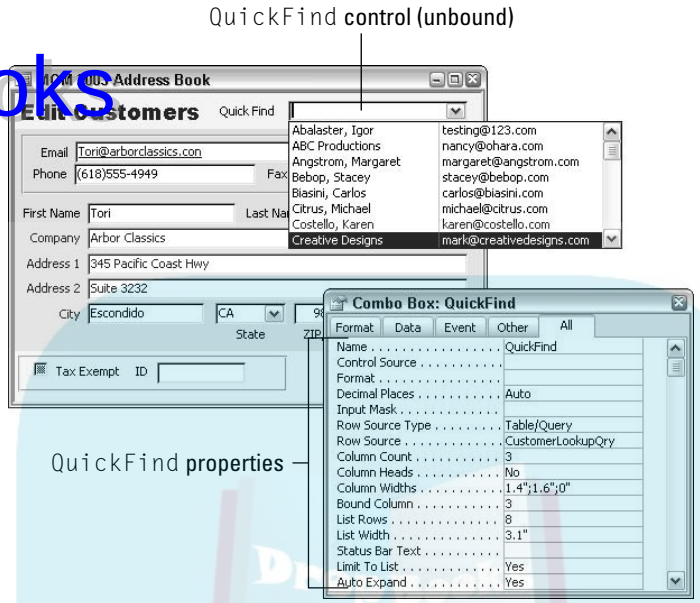

Figure 10-17: A QuickFind control offers fast customer name lookup.

Look at an example of creating a QuickFind control. Like with any combo or list box, you can begin by creating a query that defines the columns to be displayed in the list. For this example, you can use the CustomerLookupQry shown earlier in this chapter as the drop-down menu for a combo box named Quick Find. Here are the basic steps for creating such a control:

1. **In the Access database window, right-click the name of the form to which you want to add a Quick Find capability and then choose Design View.**
2. **If you want to use the Combo Box Wizard to create the initial control, make sure that the Control Wizards button in the Toolbox is pushed in. Then click the Combo Box tool and click where you want to place the control on your form.**

   The Combo Box Wizard opens.
3. **On the first wizard page, select I Want the Combo Box to Look Up the Values in a Table or Query and then click Next.**
4. **On the second wizard page, choose Queries and then select the query that contains the values to be displayed in the drop-down menu. Then click Next.**

   In my example, I click Queries and then click CustomerLookupQry.
5. **On the third wizard page, click the button with the right-facing chevrons (>) to add all the fields from your query to the drop-down menu; then click Next.**

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6. **(Optional) You can choose a sort order on the fourth wizard page. If your query already has all the records in order, you can just ignore that page and click Next.**
7. **On the fifth wizard page, size your columns.**

   As in Figure 10-15 earlier in this chapter, you can hide any column by narrowing it to the point where it's invisible. Then click Next.
8. **The sixth wizard page asks which value from the query the combo box should store. Click whichever field name would provide the most accurate search; then click Next.**

   In my example, CustID is unique to each customer, so I specify the CustID field.
9. **On the seventh wizard page, select Remember the Value for Later Use and then click Next.**
10. **On the last wizard page, type a label for the control and then click Finish.**

    I labeled my Combo Box QuickFind.

That takes care of creating the initial unbound combo box. To get it to act as a Quick Find, you need to write some VBA code. First, I suggest you go into the All tab of the Properties sheet and change the Name property something more meaningful — for example, `QuickFind` instead of `Combo01` or whatever Access named the control. Then click the Event tab in the Properties sheet and click the `After Update` event. You'll be taken to the VBA editor with the cursor in a procedure named *`control`*`_AfterUpdate()` where *`control`* is the name of your unbound `ComboBox` control.

The basic skeleton structure needed for a Quick Find procedure looks like this:

```
Private Sub controlName_AfterUpdate()
   'Clone the form's table/query into a recordset.
   Dim MyRecSet As Object
   Set MyRecSet = Me.Recordset.Clone

   'Find first matching record in the recordset.
   MyRecSet.FindFirst "[fldName] = " & Me![controlName]

   'Set the form's record to found record.
   Me.Bookmark = MyRecSet.Bookmark
End Sub
```

where *`controlName`* is the name of the unbound combo box, and *`fldName`* is the name of the field being searched in the form's underlying table or query. In my example, the `QuickFind` control will contain an integer value that matches the `CustID` value of the customer you're searching for. (Both values are integers.) The code for the `QuickFind` control, which searched the `CustID` control in the `Customers` table, looks like this:

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```
Private Sub QuickFind_AfterUpdate()
   'Clone the form's table/query into a recordset.
   Dim MyRecSet As Object
   Set MyRecSet = Me.Recordset.Clone

   'Find first matching record in the recordset.
   MyRecSet.FindFirst "[CustID] = " & Me![QuickFind]

   'Set the form's record to found record.
   Me.Bookmark = MyRecSet.Bookmark
End Sub
```

Like all procedures, this one is a series of steps. Starting at the first line, the name of the procedure defines when it runs. In this case, the procedure will run whenever a user chooses a customer from the `QuickFind` control's drop-down menu:

```
Private Sub QuickFind_AfterUpdate()
```

The following lines provide for a speedy search without any activity on the screen by using an invisible recordset to do the search behind the scenes. The `Dim` statement declares a general object named `MySetSet`. The `Set` statement makes `MyRecSet` into a recordset that's an exact clone of the table/query underlying the current form:

```
'Clone the form's table/query into a recordset.
Dim MyRecSet As Object
Set MyRecSet = Me.Recordset.Clone
```

With a simple clone recordset like this, you can use the `FindFirst` method to quickly locate a specific value in a single field. You can't do any sort of fancy SQL `WHERE` clause — only a simple *`fieldname = value`* type expression is allowed.

The next statement in the procedure uses the `FindFirst` method to locate `CustID` value in the recordset that matches whatever value is currently stored in the `QuickFind` control:

```
MyRecSet.FindFirst "[CustID] = " & Me![QuickFind]
```

It takes less than an eyeblink's time for the preceding statement to search the `CustID` field in the recordset. After the record is found, the recordset's `Bookmark` property will contain a value that indicates that record's position in the recordset. To get the form to show the record that was found in the recordset, the next statement sets the form's underlying Table/Query `Bookmark` property equal to the `Bookmark` property of the recordset:

```
Me.Bookmark = MyRecSet.Bookmark
```

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The job is done after the form is displaying the requested record, so the `End Sub` statement marks the end of the procedure

```
End Sub
```

After the procedure is written, you can close the VBA editor, as usual, save the form, and try out the new control in Form view. The lookup should work when you open the form and choose a customer from the `QuickFind` combo box.

Avoid retyping common entries

Here's another situation where a dynamic combo box can be very helpful in data entry. Suppose you have a table like `Customers` that includes a City field, and as it turns out, most of your customers are from a few nearby cities. Thus, you find yourself typing the same city name over and over again as you enter customer's data.

As an alternative to typing the same city name repeatedly, you could make the City field on the form a *self-referential* combo box that automatically lists every unique city name that's ever been typed into the form. For example, the first time you type **Los Angeles** as the city entry, that name gets added to the City field's drop-down menu. In the future, when it comes time to type Los Angeles into another record, you can just choose that name from the drop-down menu rather than retyping it again.

To get started, you'll need a drop-down menu of unique city names. You can use a query to design the initial drop-down menu. For example, Figure 10-18 shows a query named `UniqueCitiesQry` that lists, in alphabetical order, every unique city name in a field named City. Setting the `Unique Values` property in the query's Properties sheet to `Yes` is what provides the unique city names.

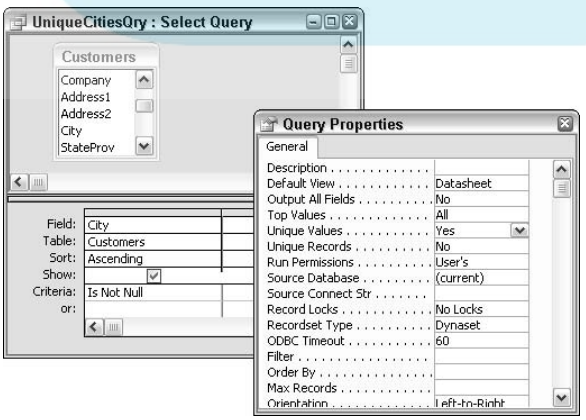

Figure 10-18: `UniqueCitiesQry` lists unique city names from the City field.

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In the query, switch to Datasheet view to make sure the query shows each city name only once and then close and save the query. You can then use the query as the Row Source for any combo box or list box that's bound to the City field. For example, on any form that will display the City field from the Customer's table, you could create a unique value's combo box by following these steps:

1. **In the Toolbox, make sure the Control Wizards button is pushed in, and then click the Combo Box tool.**
2. **Drag the City field from the Field List onto your form.**

   The Combo Box Wizard opens.
3. **On the first wizard page, select I Want the Combo Box to Look Up the Values in a Table or Query and then click Next.**
4. **On the second wizard page, choose Queries and then choose the query that shows the unique values (that would be `UniqueCitiesQry` in my example). Then click Next.**
5. **On the third wizard page, click the button with the right-facing chevrons (>) to add the field to the Selected Fields column; then click Next.**
6. **On the fourth wizard page, you can just click Next rather than a sort order (because the query has already defined a sort order).**
7. **On the fifth wizard page, adjust your column width (if necessary), and then click Next.**
8. **On the sixth wizard page, select Store That Value in This Field and the name of the field to which the combo box is attached; then click Next.**

   Most likely, the correct options will already be selected for you because you already dragged the bound field's name to the form in Step 2.
9. **Type in a label for the control (**City **in my example) and then click Finish.**

That's it. When you switch to Form view, the City drop-down menu should display the name of each unique city that's currently in the `Customers` table. It might seem like you're done, but there's just one small problem. As you add new records to the `Customers` table, the drop-down menu in the City field will not be able to keep up at first because the City field's drop-down list won't automatically requery with each new record.

The problem is easily solved with a single line of code that requeries the `City` control every time a new record is added to the `Customers` table. To requery a control with each new record, follow these steps:

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1. **In forms Design, double-click the gray area behind the Design grid to get to the Form properties in the Properties sheet.**
2. **In the Properties sheet, click the Event tab and choose the After Insert event.**
3. **Click the Build button next to the After Insert event.**

   You'll be taken to a procedure named `Form_AfterInsert()`, which will run every time the current form adds a new record to its underlying table.
4. **Within the procedure, type** Me!*fieldName*.Requery **where** *`fieldName`* **is the name of the control that contains the self-referential combo box.**

   In my example, that would be

   ```
   Me![City].Requery
   ```
5. **Choose File➪Close and Return to Microsoft Access.**
6. **Close and save your form.**

In the future, whenever you're adding records to the `Customers` table through the form, you can either type a new city name or choose an existing city name from the City drop-down menu. If you do type a new city name, that name will be added to the drop-down menu of existing field names automatically, thanks to the little, one-line VBA procedure.

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Chapter 11

Creating Your Own Functions

In This Chapter

- Deciding why to create custom functions
- Passing data to and from custom functions
- Creating a function to fix upper/lowercase problems
- Creating a function to print check amounts

As you might already know, Access has lots of built-in functions that you can use in creating expressions. When you use the Expression Builder in Access to create an expression, you can view a list of all the built-in functions and also choose any function that you want to incorporate into the expression you're writing.

First, you need to get to a place where one might actually write an expression. For example, if you're designing a table and decide to set a Default Value for a field, as soon as you click the Default Value field property, a Build button appears. Clicking that Build button opens the Expression Builder. If you set the Default Value to `=Date()`, `=Date()` is an expression that uses the built-in `Date()` function to return the current date.

You can also use expressions to create calculated fields. For example, in Chapter 10, you can read how the `CustomerLookupQry` query uses expressions to create fields named `SortName` and `EmailText`. You can also use expressions to create calculated controls on forms, where the control's `Control Source` property contains an expression that does some math or returns some value based on other data in the same form.

The Role of Functions in VBA

All the functions that are available to you in Access are also available to you in VBA. In VBA, you use the same function syntax that you use in Access. In Access, the Expression Builder is a good tool for finding out what functions are available as well as how to use them. If you're in an Access Design view and don't see a Build button to click, you can click the Build button in the toolbar to open the Expression Builder.

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After you're in the Expression Builder, click the + sign next to functions and then click Built-In Functions. If you then select <All> from the top of the middle column, the right column lists all the built-in functions in alphabetical order, as in Figure 11-1. Optionally, you can click a category name in the middle column to limit the third column's list to just the functions in that category.

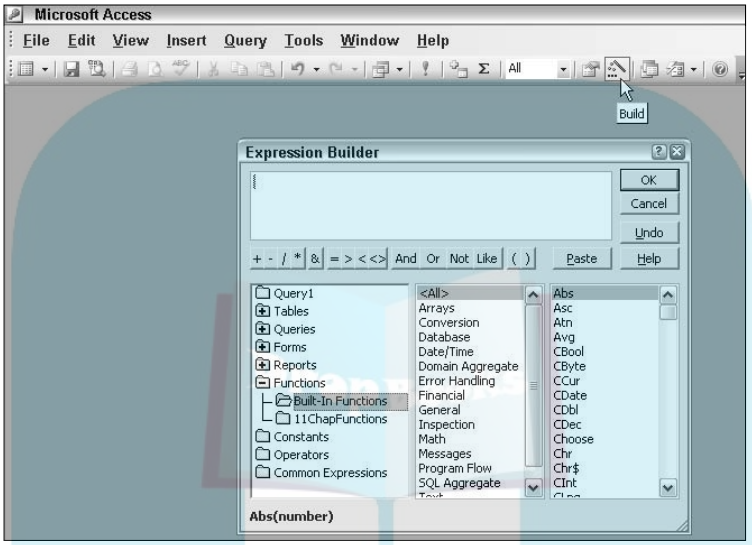

Figure 11-1: The Build button and the Expression Builder.

When you click the name of a specific function in the third column, the syntax for using that function appears in the lower-left corner of the Expression Builder. For example, the `Abs` function is selected in Figure 11-1, so the window shows `Abs(number)`. That just tells you that the `Abs` function expects a single number to be passed to it. For more information in the currently selected function, click the Help button in the Expression Builder.

Before you go trying to create your own custom functions, I recommend knowing what functions are already available to you as built-in functions. There's no need for you to reinvent the wheel by creating a custom function that duplicates a built-in function.

Every function returns some value. For example, the `Date()` function returns the current date. You could see this for yourself right in the VBA editor Immediate window. For example, if you type the following into the Immediate window and press Enter

```
? Date()
```

the Immediate window shows the value returned by the `Date` function, which would be the current date.

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I suppose I should point out that sometimes in VBA, you can often omit any empty parentheses that follow a function name. In fact, the VBA editor might even remove the closing parentheses for you, and the statement will still work after the VBA editor removes the parentheses. For example, if you enter **? Date** in the Immediate window, you get the same result if you enter **? Date()**. However, if the parentheses are not empty, you should definitely include both the opening and closing parentheses in your code.

Look at another example. The `Sqr()` function accepts a single number as an argument and returns the square root of that number. For example, if you type the following into the VBA editor Immediate window

```
? Sqr(81)
```

you get back 9, which is the square root of 81.

It often helps to imagine that the word *of* follows a function's name. For example, think of `? Sqr(81)` in the Immediate window as meaning, *What is the square root of 81?*

Creating Your Own Functions

In VBA, you can create your own custom functions to add to those that are built into Access. As a rule, you want to put all custom functions in a standard module rather than in a class module because putting a custom function in a standard module makes the function available to all the objects in the current database. In other words, any function that you create in a standard module can be used just as though it were a built-in function throughout the current database.

Work through the whole process, starting with a simple example of a custom function that calculates and returns the sales tax for any numeric value that's passed to it. You can put the function in any standard module — it doesn't really matter which. For this case, just start with a new, empty standard module.

1. **In the Access database window, click Modules.**
2. **Click the New button in the toolbar at the top of the database window.**

   You're taken to the VBA editor with a brand new, almost-empty module to work with.

All modules have the words `Option Compare Database` at the top already, so that's why I say it's an *almost-empty* module. That first declaration, `Option Compare Database`, just tells the module that any comparisons using operators like = or > should be performed using the same rules as the rest of the current database. There's no need to change that line.

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3. **Choose Insert➪Procedure from the VBA editor menu bar.**

   The Add Procedure dialog box opens, asking for the name, type, and scope of the procedure.

   The name must start with a letter and cannot contain any blank spaces. For this example, you could name the function `SalesTax`.

4. **Choose Function as the type (because you're creating a custom function here) and Public as the scope (so that all other objects within the database can use the function).**

5. **Click OK in the Add Procedure dialog box.**

   The module contains the first and last lines of the procedure, as follows:

```
Public Function SalesTax()

End Function
```

Passing data to a function

In most cases, you want your function to accept one or more values that you pass to it as data for the function to operate upon. For example, the `Sqr()` function accepts a single argument, which must be a number. To define the arguments that your custom function accepts, use the following syntax, inside the parentheses that follow the function name:

```
name As Type
```

where *name* is just some name that you make up to use as a placeholder for the incoming value, and *Type* is a valid data type. For example, suppose you want the custom `SalesTax()` function to accept a single numeric value as an argument. You need to make up a name for that, so just call it `AnyNum`. You also have to define that incoming value as some sort of number. Most likely, the passed value will be a `Currency` value anyway, so you can modify the custom `SalesTax()` function as follows to accept a single number as an argument:

```
Public Function SalesTax(AnyNum As Currency)

End Function
```

What the first line above really means is *Expect some number to be here when called. Refer to that number as `AnyNum` and treat it as a `Currency` number (two decimal places).*

A function can accept any number of arguments. If you want a function to accept multiple arguments, give each argument a name and data type by using the same preceding syntax. Separate each definition with a comma. The

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SalesTax() function needs to accept only one argument, so you wouldn't want to modify that one. However, just as a general example, if you want a function to accept two arguments, you define each as in the following example:

```
Public Function funcName(AnyNum As Currency, AnyText As String)

End Function
```

Returning a value from a function

A function can also return a value — that is, only *one* value because a function can't return multiple values. To make your function return a value, you just add

```
As Type
```

where *Type* is a valid data type, to the end of the first statement, outside the closing parenthesis of the function name. You specify only the data type of the returned value — you don't give it a name. For example, suppose you want the SalesTax() function to return a single value that's a Currency number. In that case, modify the SalesTax() function as follows:

```
Public Function SalesTax(AnyNum As Currency) As Currency

End Function
```

The custom function doesn't actually return its value until all the code in the procedure has been executed. To define the value returned by the function, use this syntax:

```
functionName = value
```

where *functionName* is the same as the name of the function itself, without the parentheses, and *value* is the value that you want the function to return (although the value can be an expression that calculates a return value).

For example, suppose you want to be able to pass to the SalesTax() function some Currency value like $100.00 or $65.45 or whatever, and have it return the sales tax for that amount. Just picking a number out of a hat, say the sales tax rate is 6.75%. The following SalesTax() function will do the appropriate calculation (by multiplying the number passed to it by 0.065) and then return the results of that calculation:

```
Public Function SalesTax(AnyNum As Currency) As Currency
   'Multiply passed value by 6.75% (0.065) and
   'return the result of that calculation.
   SalesTax = AnyNum * 0.065
End Function
```

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Testing a custom function

Remember earlier when I said that a public custom function in a standard module can be used anywhere a built-in function? After you type in the `SalesTax()` function, you can see that for yourself by testing it the same way that you test a built in function. For example, if you type the following into the Immediate window

```
? SalesTax(100)
```

and then press Enter, you get

```
6.75
```

because the sales tax on $100.00 is $6.75. If you type

```
? SalesTax(14.99)
```

and press Enter, you get 1.0118 because the sales tax on $14.99 is about $1.02.

In case you're wondering why all the numbers aren't automatically rounded off, it's because the Immediate window always displays its results as sort of a plain number. In real life, you wouldn't create a function just to use it in the Immediate window. More likely, you'd use the custom function in queries, forms, reports, or macros.

For example, suppose you create the `SalesTax()` function above and then choose File➪Close and Return to Microsoft Access from the VBA editor menu bar. Next, you want to create a query that lists the unit price and sales tax for all the records in some table. Because you can use a custom function just like you do a built-in one, you could set up the query as shown in the Query Design portion of Figure 11-2, where the Unit Price column refers to a field in the Order Details table, and Tax is a calculated field that uses the custom `SalesTax()` function.

The lower half of Figure 11-2 shows the results of the query in Datasheet view. The Unit Price column displays the Unit Price from each record in the underlying table. The Tax column shows the sales tax amount for each unit price.

The query in Figure 11-2 is just an example, of course. You could use the custom `SalesTax()` function any place you could use a built-in function, such as in the `Control Source` property of a calculated control or wherever you'd use a built-in function in a VBA statement.

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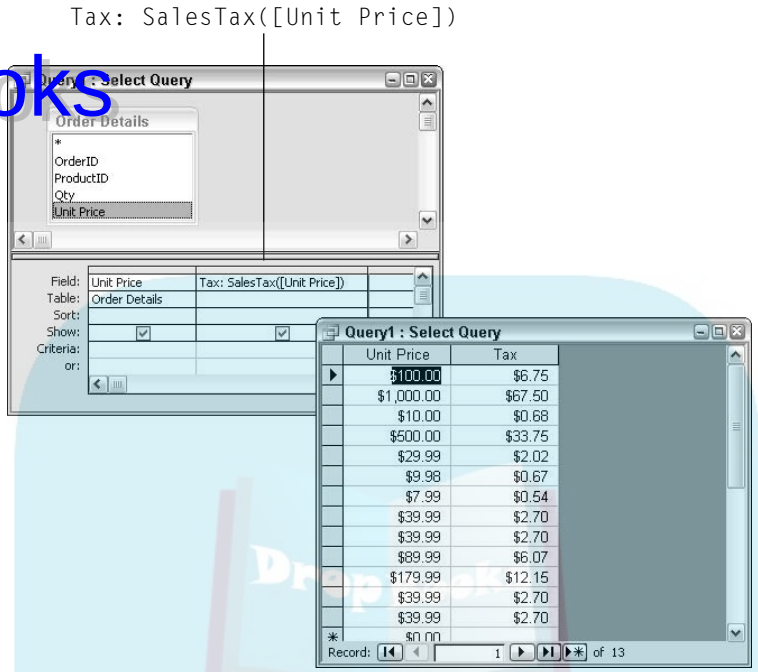

Figure 11-2: Custom `SalesTax()` function used in a query's calculated field.

A Proper Case Function

Take a look now at a somewhat larger custom function that does more than a simple match calculation. Suppose you have a table filled with names and addresses, but for whatever reason, all the text is in uppercase (or lowercase). For example, maybe the table has a Name field containing names like JOE SMITH or joe Smith. You want to tidy that up, but you certainly don't want to go in and retype all the data manually.

Technically, you could just use the built-in `StrConv(`*`string`*`,3)` function to solve this problem. For example, `StrConv("JOE SMITH",3)` returns Joe Smith. Problem solved . . . except that `StrConv()` doesn't take into consideration little quirks like the uppercase D in McDonald. `StrConv("MCDONALD",3)` returns Mcdonald (rather than McDonald). Likewise, `StrConv("p.o. box 123",3)` returns P.o. Box 123, which doesn't look quite right because the O should be uppercase.

To get around that, you could create your own custom function that takes any string as its argument and then returns that string with initial caps (the first letter of each word capitalized), just like the `StrConv()` function does.

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But your custom function could then use some `If...End If` statements to correct any little problems like the Mcdonald and P.o. Box examples.

You don't really have to type any of the functions shown in this book into your own database. You can download them from `www.coolnerds.com/vba` and just import them into a database.

You might want to use this function to fix several fields in several tables, so you want the function to be public, like any built-in function. For starters, you need to open or create a standard module. Think up a name for your function (I call this one `PCase()`) and create an appropriate function. In this case, you need to pass a string (which I refer to as `AnyText`) to the function. The return value for the function will also be a string (whatever text was passed converted to initial caps). Listing 11-1 shows the function in its entirety. I take a look at how it works in a moment.

Listing 11-1: Sample PCase() Custom Function

```
'The PCase() function accepts any string, and returns
'a string with words converted to initial caps (proper case).
Public Function PCase(AnyText As String) As String
    'Create a string variable, then store AnyText in
    'that variable already converted to proper case
    'using the built-in StrConv() function
    DIm FixedText As String
    FixedText = StrConv(AnyText, vbProperCase)

    'Now, take care of StrConv() shortcomings

    'If first two letters are "Mc", cap third letter.
    If Left(FixedText, 2) = "Mc" Then
        FixedText = Left(FixedText, 2) + _
            UCase(Mid(FixedText, 3, 1)) + Mid(FixedText, 4)
    End If

    'If first three letters are "Mac", cap fourth letter.
    If Left(FixedText, 3) = "Mac" Then
        FixedText = Left(FixedText, 3) + _
            UCase(Mid(FixedText, 4, 1, )) + Mid(FixedText, 5)
    End If

    'If first four characters are P.o. then cap the "O".
    If Left(FixedText, 4) = "P.o." Then
        FixedText = "P.O." + Mid(FixedText, 5)
    End If

    'Now return the modified string.
    PCase = FixedText
End Function
```

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How PCase() works

Before I talk about using the `PCase()` function, take a moment to see how it works. `PCase()` uses several built-in Access functions — `StrConv()`, `Left()`, `UCase()`, and `Mid()` — to work with chunks of text in the passed string. For the sake of example, see what happens when `PCase()` gets called with something like `PCase("MACDONALD")`:

When `PCase()` is called in this example, `AnyText` becomes a string variable that contains the text `MACDONALD`. The `AnyText` argument is defined as a string in the `Function()` statement itself, as shown here:

```
Public Function PCase(AnyText As String) As String
```

The next two statements declare a new string variable named `FixedText`, which act as a placeholder for text being operated upon by the function. The `Dim` statement just declares the variable as a string. The second statement stores a copy of `AnyText`, already converted to proper case by using the `StrConv()` method:

```
    Dim FixedText As String
    FixedText = StrConv(AnyText, vbProperCase)
```

In VBA, you can use constants (like `vbProperCase`) rather than numbers (like `3`) in built-in functions. Thus, `StrConv(AnyText, vbProperCase)` is the same as `= StrConv(AnyText, 3)`.

Going back to the example of calling the function, by the time the two preceding statements have been executed, the `FixedText` variable contains `Macdonald`. That's close to what you need, but the function isn't done working yet.

The next statements say, *If the first two letters of `FixedText` are Mc, change `FixedText` to the first two characters of `FixedText` unchanged, followed by the third letter in uppercase, followed by all the rest unchanged.*

```
'If first two letters are "Mc", cap third letter.
If Left(FixedText, 2) = "Mc" Then
   FixedText = Left(FixedText, 2) + _
      UCase(Mid(FixedText, 3, 1)) + Mid(FixedText, 4)
End If
```

Because `FixedText` at this moment in time contains *Macdonald,* this block of code is ignored because its first two letters are *ma,* not *mc.* By the time the preceding statements execute (in this example), `FixedText` still contains Macdonald. Nothing has changed there.

The following block of code says, *If the first three characters are mac, change `FixedText` to the first three letters of itself, followed by the fourth letter in uppercase, then the rest of the string unchanged.*

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```
'If first three letters are "Mac", cap fourth letter.
If Left(FixedText, 3) = "Mac" Then
    FixedText = Left(FixedText, 3) + _
    UCase(Mid(FixedText, 4, 1)) + Mid(FixedText, 5)
End If
```

In the current example, `FixedText` contains Macdonald when code execution reaches the `If` statement. And the first three letters of `FixedText` are indeed *mac;* thus, the code inside the `If...End If` block will execute. In doing so, it changes `FixedText` to its own first three letters unchanged (Mac), plus the fourth letter in uppercase (D), plus the rest of the string, unchanged (onald). By the time execution gets past the `End If` statement in this example, `FixedText` contains MacDonald.

The following block of code does basically the same thing as the two preceding blocks. It looks to see whether the first four letters of the string are P.o. — and if so, changes those first four letters to P.O. Of course, the first four letters of MacDonald aren't P.O., so that whole block of code is skipped over.

These final statements assign the current contents of the `FixedText` variable (MacDonald, now) to the function name sans parentheses `(PCase)`. The `End Sub` statement then ends the function and returns the contents of `PCase` (MacDonald) to the code (or object) that called the function.

```
    PCase = FixedText
End Sub
```

If you type **? PCase("macdonald")** into the Immediate window, it returns MacDonald. If you type **? PCase("P.O. BOX 123")** into the Immediate window, you get P.O. Box 123. If you type **? PCase("HELLO WORLD")** into the Immediate window, you get Hello World. The `StrConv()` function inside `PCase()` still does its thing. The `If...End If` statement just makes minor corrections for Mc, Mac, and P.O..

Using the PCase() function

Like with any custom function, you can use `PCase()` wherever you would use a built-in function. Look at an example where you have a large table of names and addresses, where everything is in uppercase, as in Figure 11-3. For the sake of example, call this table `UglyCustomers` (which isn't an insult to the customers — just the way their names are typed in!).

Now that you have a `PCase()` function that can convert text to proper case — without messing up the Mc's, Mac's and P.O.'s — you can use that in an update query to convert all the Text fields to proper case.

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UglyCustomers : Table

CustID	FirstName	LastName	Company	Address1
1	TORI	PINES	ARBOR CLASSICS	345 PACIFIC COAST HWY
2	MARILOU	MIDCALF		500, 999-6TH STREET SW
3	WILMA	WANNABE	WANNABE WHISTLES	1121 RIVER ROAD, SUITE 23
4	FRANKLY	UNCTUOUS		734 N. RAINBOW DR.
5	MARGARET	ANGSTROM		P.O. BOX 1295
6	MARGIE	MCDONALD		1370 WASHINGTON LANE
7			ABC PRODUCTIONS	HAVERSTON SQUARE
8	HORTENSE	HIGGLEBOTTOM		P.O. BOX 1014
9	PENNY	MACDOUGAL		P.O. BOX 10
10	MATILDA	STARBUCK		323 SHIRE LANE
11	SCOTT AND N	SCHUMACK		228 HOLLYWOOD DRIVE
12	LINDA	PETERSON		823 PASEO CANCUN
13	INO	YASHA		1788 PORT CARLO CIRCLE
14			WILEY WIDGETS	97 ROBERTS DR.
15	DOMINIC	MCFERRIN		45 ALBANY ROAD
16	ROSEMARY	STICKLER		1205 HUNTINGDON CT.
17	EDMUND	KANE		615 LEVICK STREET
18	KELLEY	MONKHOUSE		6 OAKCLIFF DR

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Figure 11-3: Sample problem table in all uppercase.

Test it on a *copy* of your original table first. That way, if you made any mistakes that mess up the data, you will have only ruined the copy of the table.

To create an update query to do the job, close the VBA editor to get back to Access. Then create a new query that uses the problem table as its source. Next, choose Query➪Update Query to convert the query to an update query. The Query-by-Example (QBE) grid gains an Update To column, in which you can add an expression that defines the new value for a field. Thus, you can add any Text field that needs converting to the QBE grid, and then use the expression `=PCase([fieldname])` (where *fieldname* is the same name as the field at the top of the column) to convert that field to proper case.

Figure 11-4 shows an example in which I'm fixing the `FirstName`, `LastName`, `Company`, and `Address1` fields (as well as others that are just scrolled out of view). Notice that the Update To row for the `FirstName` field is `PCase([FirstName])`. The Update To row for the `LastName` field is `PCase([LastName])`, and so forth. In other words, when the query runs, you want it to replace the contents of that field, in every record, to proper case.

Query1 : Update Query

UglyCustomers

*
CustID
FirstName
LastName
Company
Address1

Field:	FirstName	LastName	Company	Address1
Table:	UglyCustomers	UglyCustomers	UglyCustomers	UglyCustomers
Update To:	PCase([FirstName])	PCase([LastName])	PCase([Company])	PCase([Address1])
Criteria:				
or:				

Figure 11-4: Query to fix uppercase problems in a table.

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The query shown in Figure 11-4 wouldn't work in a database that doesn't contain the `PCase()` function. It will work only in a database that has the `PCase()` function defined in one of its standard modules.

Because the query shown in Figure 11-4 is an action query, you need to run the query before it actually does anything.

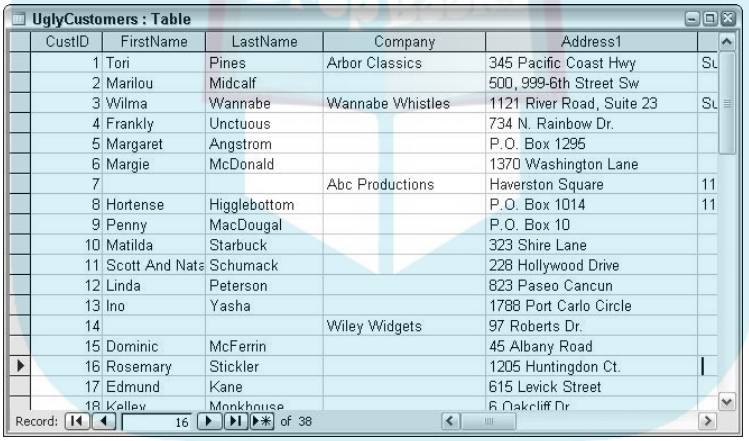
1. **Click the Run button in the toolbar or choose Query➪Run from the Access toolbar.**

   You get the standard warning message (`You are about to update x rows...`).

2. **Click Yes and wait a second. Then just close the query.**

3. **Back at the database window, click Tables, and then click the table that you changed.**

   If all went well, the fields will be in proper case. Figure 11-5 shows the results of running the sample query on the `UglyCustomers` table.



UglyCustomers : Table

CustID	FirstName	LastName	Company	Address1	
1	Tori	Pines	Arbor Classics	345 Pacific Coast Hwy	Su
2	Marilou	Midcalf		500, 999-6th Street Sw	
3	Wilma	Wannabe	Wannabe Whistles	1121 River Road, Suite 23	Su
4	Frankly	Unctuous		734 N. Rainbow Dr.	
5	Margaret	Angstrom		P.O. Box 1295	
6	Margie	McDonald		1370 Washington Lane	
7			Abc Productions	Haverston Square	11
8	Hortense	Higglebottom		P.O. Box 1014	11
9	Penny	MacDougal		P.O. Box 10	
10	Matilda	Starbuck		323 Shire Lane	
11	Scott And Nata	Schumack		228 Hollywood Drive	
12	Linda	Peterson		823 Paseo Cancun	
13	Ino	Yasha		1788 Port Carlo Circle	
14			Wiley Widgets	97 Roberts Dr.	
15	Dominic	McFerrin		45 Albany Road	
16	Rosemary	Stickler		1205 Huntingdon Ct.	
17	Edmund	Kane		615 Levick Street	
18	Kelley	Monkhouse		6 Oakcliff Dr	

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Figure 11-5: Convert text fields by using the custom `PCase()` function.

As you can see, the names and addresses in the fixed `UglyCustomers` table look a lot better than those in the original table. And the Mc and Mac last names — as well as the P.O. Box entries — look okay, too. Still, not everything is perfect. For example, Abc Productions probably should be ABC Productions. However, it would be pretty tough to write a function that deals with every conceivable exception to the standard use of uppercase letters in proper nouns. Some you might have to polish manually, but polishing off a few of them manually is a heck of a lot easier than retyping them all from scratch!

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A Function to Print Check Amounts

Suppose you want to use Access to print checks from a table of payable amounts. You have your printer, and you have your preprinted checks, and maybe you've already created a report format to print the checks. But what about the part of the check where you're supposed to write out the dollar amount, such as One Hundred Thirty Five and 49/100? How are you going to get that part of the check printed? There's no built-in function capable of doing that for you. And heaven knows you don't want to type all those words!

The solution is a custom function like `NumWord()` that takes as its argument any number and returns that number translated to words. For example, typing **? NumWord(1234.56)** returns One Thousand Two Hundred Thirty Four and 56/100. Because the `NumWord()` function is fairly lengthy, download it from `www.coolnerds.com/vba` rather than try to type it in yourself. Just in case, Listing 11-2 holds the whole kit-and-caboodle, which you can place in any standard module in any database.

Listing 11-2: Custom NumWord() Function

```
'NumWord() converts a number to its words.
'For example, NumWord(999.99) returns
'Nine Hundred Ninety Nine and 99/100.
Function NumWord(AmountPassed As Currency) As String

   'Declare some general working variables.
   Dim English, strNum, Chunk, Pennies As String
   Dim Hundreds, Tens, Ones As Integer
   Dim StartVal, LoopCount As Integer
   Dim TensDone As Boolean

   'Make array of number words called EngNum.
   Dim EngNum(90) As String
   EngNum(0) = ""
   EngNum(1) = "One"
   EngNum(2) = "Two"
   EngNum(3) = "Three"
   EngNum(4) = "Four"
   EngNum(5) = "Five"
   EngNum(6) = "Six"
   EngNum(7) = "Seven"
   EngNum(8) = "Eight"
   EngNum(9) = "Nine"
   EngNum(10) = "Ten"
   EngNum(11) = "Eleven"
   EngNum(12) = "Twelve"
   EngNum(13) = "Thirteen"
   EngNum(14) = "Fourteen"
   EngNum(15) = "Fifteen"
```

(continued)

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Listing 11-2 ***(continued)***

```
    EngNum(16) = "Sixteen"
    EngNum(17) = "Seventeen"
    EngNum(18) = "Eighteen"
    EngNum(19) = "Nineteen"
    EngNum(20) = "Twenty"
    EngNum(30) = "Thirty"
    EngNum(40) = "Forty"
    EngNum(50) = "Fifty"
    EngNum(60) = "Sixty"
    EngNum(70) = "Seventy"
    EngNum(80) = "Eighty"
    EngNum(90) = "Ninety"

    '** If zero or null passed, just return "VOID".
    If Nz(AmountPassed) = 0 Then
       NumWord = "VOID"
       Exit Function
    End If

    '** strNum is the passed number converted to a string.
    strNum = Format(AmountPassed, "000000000.00")

    'Pennies variable contains last two digits of strNum
    Pennies = Mid(strNum, 11, 2)

    'Prep other variables for storage.
    English = ""
    LoopCount = 1
    StartVal = 1

    '** Now do each 3-digit section of number.
    Do While LoopCount <= 3
       Chunk = Mid(strNum, StartVal, 3) '3-digit chunk.
       Hundreds = Val(Mid(Chunk, 1, 1)) 'Hundreds portion.
       Tens = Val(Mid(Chunk, 2, 2)) 'Tens portion.
       Ones = Val(Mid(Chunk, 3, 1)) 'Ones portion.

       '** Do the hundreds portion of 3-digit number.
       If Val(Chunk) > 99 Then
          English = English & EngNum(Hundreds) & " Hundred "
       End If

       '** Do the tens & ones portion of 3-digit number.
       TensDone = False
       '** Is it less than 10?
       If Tens < 10 Then
          English = English & " " & EngNum(Ones)
          TensDone = True
       End If
```

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```
        '** Is it a teen?
        If (Tens >= 11 And Tens <= 19) Then
           English = English & EngNum(Tens)
           TensDone = True
        End If

        '** Is it evenly divisible by 10?
        If (Tens / 10) = Int(Tens / 10) Then
           English = English & EngNum(Tens)
           TensDone = True
        End If

        '** Or is it none of the above?
        If Not TensDone Then
           English = English & EngNum((Int(Tens / 10)) * 10)
           English = English & " " & EngNum(Ones)
        End If

        '** Add the word "Million" if necessary.
        If AmountPassed > 999999.99 And LoopCount = 1 Then
           English = English + " Million "
        End If

        '** Add the word "Thousand" if necessary.
        If AmountPassed > 999.99 And LoopCount = 2 Then
           English = English + " Thousand "
        End If

        '** Do pass through next three digits.
           LoopCount = LoopCount + 1
           StartVal = StartVal + 3
     Loop

     '** Done: Return English with Pennies/100 tacked on.
     NumWord = Trim(English) & " and " & Pennies & "/100"

End Function
```

That function is too long to show in the Code window (and too boring to discuss in any detail right now). So just assume that you've already stuck the entire `NumWord()` procedure into some standard module in your database, and now you want to use it to print checks.

Using the NumWord function

For the sake of example, assume that you already put `NumWord()` into a standard module in your database. You already have a table that contains data to be printed on checks. Just to give this whole example some context, suppose

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you have a table with field names and data types similar to those shown in the sample `Payables` table in Figure 11-6. The left side of the figure shows the table's structure, and the right side of the figure shows some sample data in the table.

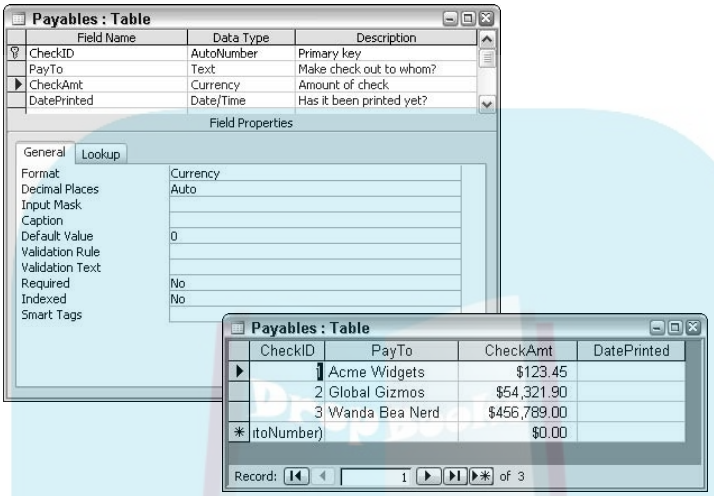

Figure 11-6: Sample field names and data types for printing checks.

Next, you need to create a report format that's capable of printing on the checks. When you get to the part of the report where the check amount needs to be printed, just add a calculated control that prints the `NumWord` of the numeric check amount. For example, in the `PrintChecks` report shown in Figure 11-7, you can see where I've placed various controls to line up with blanks on each check (even though I don't really have a preprinted check here to show you). Presumably, all the other info the check needs is already printed on the check.

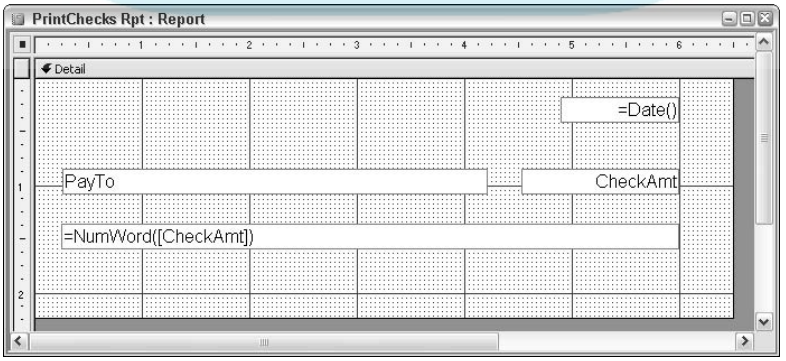

Figure 11-7: Sample report format for printing checks.

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In the report format shown in Figure 11-7, the `PayTo` and `CheckAmt` fields come straight from the underlying `Payables` table. The check date and check amount in words are both calculated controls. The calculated control for printing the check date has as its `Control Source` property the expression `=Date()`, which prints the current date on the check. The calculated control for printing the check amount in words contains the following expression as its `Control Source` property:

```
=NumWord([CheckAmt])
```

There, the field name `CheckAmt` refers to the field named `CheckAmt`, which contains the check amount expressed as a number. Once again, the example illustrates how after you add a custom function to a standard module, you can use that function in any place you'd use a built-in function. For example, the check date is printed by using the built-in `Date()` function, and the check amount (in words) is printed by the custom `NumWord()` function.

Figure 11-8 shows a Print Preview for the report in Figure 11-7 (with some dashed lines artificially thrown in to make it easier to see where each check begins and ends). As mentioned, here I'm assuming any other information that needs to be printed on the check is already on the checks.

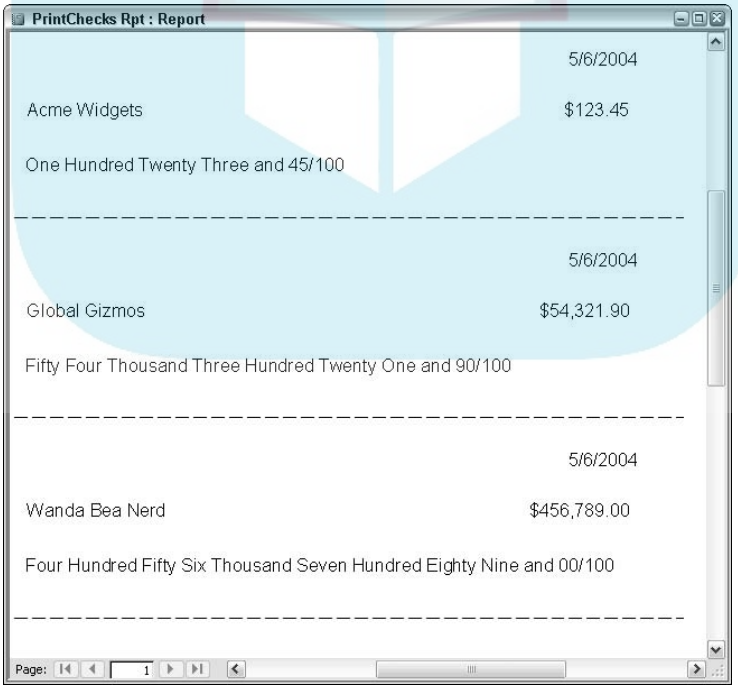

Figure 11-8: Print Preview of sample check-printing report.

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How NumWord() works

NumWord() is a fairly lengthy procedure mainly because the rules for converting numbers to words, in English, are a little complicated. But like any procedure, NumWord() is just a series of small decisions and steps needed to get the job done.

The first line of the procedure, as follows, defines the name of the procedure, NumWord(), and declares that it will accept a number Currency value (number) as an argument. Whatever number gets passed to the argument is referred to as AmountPassed in the rest of the procedure. The As String part at the end declares that NumWord() will return a string (text) to whatever called the function.

```
Function NumWord(AmountPassed As Currency) As String
```

The next lines declare some variables used for temporary storage by the procedure. Because there are lots of things to keep track of in this procedure, you need quite a few variables to store bits of information. In the following Dim statements, I'm just declaring the names and data types of the variables. You can see how to put them to use later in the procedure:

```
'Declare some general working variables.
Dim English, strNum, Chunk, Pennies As String
Dim Hundreds, Tens, Ones As Integer
Dim StartVal, LoopCount As Integer
Dim TensDone As Boolean
```

Next, the statement Dim EngNum(90) As String declares any array of variables, all containing text. The variables created by the statement will be named EngNum(0), EngNum(1), EngNum(2), and so forth, on up to EngNum(90). The Dim statement, as always, just sets aside space for those 90 variables. The variables don't actually contain any data at first:

```
Dim EngNum(90) As String
```

The next statements assign text to some of the variables that the Dim statement just declared. You don't need all 90 variables here — just enough of them to cover every possible unique number word. For example, you need *ninety* as a unique word, but you don't need ninety-one as a unique word because that can be built from two words: *ninety* and *one*.

The subscript for each variable matches the word that the variable contains. For example, EngNum(1) contains "One", EngNum(11) contains "Eleven", EngNum(70) contains "Seventy", and so forth. In a sense, you've already solved part of the problem just by having the array subscript match the word that you need:

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```
EngNum(0) = ""
EngNum(1) = "One"
EngNum(2) = "Two"
EngNum(3) = "Three"
EngNum(4) = "Four"
EngNum(5) = "Five"
EngNum(6) = "Six"
EngNum(7) = "Seven"
EngNum(8) = "Eight"
EngNum(9) = "Nine"
EngNum(10) = "Ten"
EngNum(11) = "Eleven"
EngNum(12) = "Twelve"
EngNum(13) = "Thirteen"
EngNum(14) = "Fourteen"
EngNum(15) = "Fifteen"
EngNum(16) = "Sixteen"
EngNum(17) = "Seventeen"
EngNum(18) = "Eighteen"
EngNum(19) = "Nineteen"
EngNum(20) = "Twenty"
EngNum(30) = "Thirty"
EngNum(40) = "Forty"
EngNum(50) = "Fifty"
EngNum(60) = "Sixty"
EngNum(70) = "Seventy"
EngNum(80) = "Eighty"
EngNum(90) = "Ninety"
```

For the lowdown on arrays, see Chapter 4.

With all the needed variables declared, the procedure can get to work on translating whatever number was passed to it. The first `If...End If` block takes care of the problem of a zero or null value being passed to the function. The built-in `Nz()` (Null-To-Zero) converts a null value to a zero. Thus, the `If` statement `Nz(AmountPassed) = 0 Then` really says, *If the amount passed to me to work on is zero (or a null), then do the lines below me up to End If. Otherwise, ignore those statements.*

So what happens if `AmountPassed` is a zero or null? The statement `NumWord = "VOID"` makes the return value for the function into the word `VOID`, and the `Exit Function` statement tells VBA to just bail out of the procedure now without doing anything else:

```
'** If zero or null passed, just return "VOID".
If Nz(AmountPassed) = 0 Then
   NumWord = "VOID"
   Exit Function
End If
```

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Assuming that the amount passed to `NumWord()` is not a zero or null, execution then picks up at the following statement. This one is a little tricky. It uses the built-in `Format` function to make a string named `strNum` that exactly matches the amount passed. However, this string has exactly nine zeroes to the left of the decimal point and also two to the right. Suppose `NumWord` gets called with `NumWord(7609511.98)`. By the time the following statement executes, the `AmountPassed` variable (a number) contains `7609511.98`, and `strNum` contains (as a string) `007609511.98`. Having those leading zeroes in place makes it easier to make decisions about how to handle the number later in the procedure:

```
'** strNum is the passed number converted to a string.
strNum = Format(AmountPassed, "000000000.00")
```

So getting back with the `NumWord(7609511.98)` call, after the preceding statement executes, you have two copies of the amount passed to work with: the original `AmountPassed` (a number) and `strNum`, which is basically that same number with a fixed amount of leading zeroes, as follows:

```
AmountPassed = 7609511.98
strNum = "007609511.98"
```

Next, the following statement grabs the last two digits off of `StrNum` and stores that value in a variable named `Pennies`.

```
'Pennies variable contains last two digits of strNum
Pennies = Mid(strNum, 11, 2)
```

In this example where I'm using 7609511.98 as the number passed, the variable named `Pennies` contains the following after the preceding statement executes:

```
Pennies = "98"
```

Now you need to get some starting values in some variables for the code to follow. The variable named `English` (which will eventually contain the entire number word) starts off as a null (`""`). `LoopCount` and `StartVal` each get values of `1`. You can see how to use those variables in the code that follows: `'Prep other variables for storage`.

```
English = ""
LoopCount = 1
StartVal = 1
```

Next, start a loop that will repeat until the `LoopCount` variable is greater than three. Within that tool, the first thing you do is peel off chunks of `strNum` variable and assign them to integer variables:

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```
'** Now do each 3-digit section of number.
Do While LoopCount <= 3
   Chunk = Mid(strNum, StartVal, 3) '3-digit chunk
   Hundreds = Val(Mid(Chunk, 1, 1)) 'Hundreds portion
   Tens = Val(Mid(Chunk, 2, 2)) 'Tens portion
   Ones = Val(Mid(Chunk, 3, 1)) 'Ones portion
```

Getting back to the initial `strNum` number, 007609511.98, by the time the preceding statements execute, the following variables contain the following values:

```
Chunk = "007"
Hundreds = 0
Tens = 7
Ones = 7
```

The next statement says, *If the value of chunk (007 right now) is greater than 99, add `EngNum(Hundreds)` plus the word hundred to the string.* In the current example, where `Chunk` is not greater than 99, nothing happens in this `If...End If` block:

```
'** Do the hundreds portion of 3-digit number
If Val(Chunk) > 99 Then
   English = English & EngNum(Hundreds) & " Hundred "
End If
```

The next statements set the `Boolean` variable `TensDone` to `False`. Then the next statement says, *If the `Tens` portion is less than 10, add a blank space and `EngNum(Ones)` to the `English` variable and change `TensDone` to `True`.*

```
'** Do the tens & ones portion of 3-digit number
TensDone = False
'** Is it less than 10?
If Tens < 10 Then
   English = English & " " & EngNum(Ones)
   TensDone = True
End If
```

In this case, where `Tens` contains `7`, the statement is true. By the time the preceding statements have executed (given the sample number), the following variables have the following values:

```
English  = " Seven"
TensDone = True
```

The next `If...End If` statement deals with numbers in the range of 11–19. It says, *If the `Tens` number is between 11 and 19, add `EngNum(Tens)` to `English` and set `TensDone` to `True`.* In this example, `Tens` is `7`, which is not between 11 and 19, so this `If` block is skipped over. The contents and `English` and `TensDone` haven't changed:

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```
'** Is it a teen?
If (Tens >= 11 And Tens <= 19) Then
   English = English & EngNum(Tens)
   TensDone = True
End If
```

The next block deals with `Tens` values that are evenly divisible by 10, such as 10, 20, 30, 40, 50, and so forth up to 90. In this case, where `Tens` contains `7` (which is not evenly divisible by 10), nothing happens, so the `English` and `TensDone` variables hang on to their current values:

```
 '** Is it evenly divisible by 10?
If (Tens / 10) = Int(Tens / 10) Then
   English = English & EngNum(Tens)
   TensDone = True
End If
```

The next `If` block kicks in only if the `Tens` portion of the number is still unresolved: that is, only if `TensDone` is still `False`. In this case, where `TensDone` got set to `True` already, the whole `If...End If` block is once again skipped over:

```
 '** Or is it none of the above?
If Not TensDone Then
   English = English & EngNum((Int(Tens / 10)) * 10)
   English = English & " " & EngNum(Ones)
End If
```

Next look at adding the word *million* to the word. The `If` statement says, *If the amount passed is greater than 999,999.99 and the `LoopCount` variable equals one, add the word Million to `English`.*

```
 '** Add the word "Million" if necessary
If AmountPassed > 999999.99 And LoopCount = 1 Then
   English = English + " Million "
End If
```

Using the running example, the number passed is greater than 999,999.99, and right now `LoopCount` does equal `1`. By the time the preceding `If` statement executes, the `English` variable has had the word `Million` tacked onto it, as follows:

```
English = "Seven Million"
```

The next statement says that if the amount passed is greater than 999.99 and `LoopCount` equals `2`, tack on the word *Thousand.* In the running example, where `LoopCount` currently equals `1`, this whole block of code is skipped over:

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```
 '** Add the word "Thousand" if necessary
If AmountPassed > 999.99 And LoopCount = 2 Then
   English = English + " Thousand "
End If
```

The next statements increase the value of the `LoopCount` variable by `1` and increase the value of the `StartVal` variable by `3`; then the `Loop` statement sends execution back up to the `Do While LoopCount <= 3` statement for the next pass through the loop.

Converting the rest of the number is more of the same. The next pass through the loop just has to work with the next three-digit chunk of `strNum`. In this example, where `strNum` contains `007609511.98`, the next three digits after 007 are 609. By the time `Chunk`, `Hundreds`, `Tens`, and `Ones` have received their new values near the top of the loop, those variables contain the following values:

```
Chunk = 609
Hundreds = 6
Tens = 9
Ones = 9
```

Looking through just the `If...End If` statements that prove true for this second pass through the loop, the statement `Val(Chunk) > 99` is true this time. Thus, the statement `English = English & EngNum(Hundreds) & " Hundred "` executes adding `EngNum(6)` plus the word `"Hundred"` to `EngNum`. By the time that statement has executed, the `English` variable has a new value:

```
English = "Seven Million Six Hundred"
```

The statement `If Tens < 10 Then` is also `True` on this second pass through the loop, so the statement `English = English & " " & EngNum(Ones)` adds a space and `EngNum(9)` to the `English` variable:

```
English = "Seven Million Six Hundred Nine"
```

No other `If` statements will prove `True` here until `If AmountPassed > 999.99 And LoopCount = 2 Then` executes. Because it's true that `AmountPassed` is greater than 999.99 and `LoopCount = 2` right now, the statement `English = English + " Thousand "` executes, and the `English` variable contains

```
English = "Seven Million Six Hundred Nine Thousand"
```

Now you're at the bottom of the loop again, where `LoopCount` gets increased by `1`, and `StartVal` gets increased by `3`. By the time the `Loop` statement sends control back up to the `Do While` statement, those variables contain the following values:

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```
LoopCount = 3
StartVal = 9
```

At the top of the loop, the `Chunk`, `Hundreds`, `Tens`, and `Ones` variable all get new values, as follows, by peeling off the last three digits to the left of the decimal point:

```
Chunk = "511"
Hundreds = 5
Tens = 11
Ones = 1
```

Once again, execution goes through all the statements, but only certain `If...End If` statements will prove true. For example, the first `True` statement, `If Val(Chunk) > 99`, executes the statement `English = English & EngNum(5) & " Hundred "`. By the time that `If...End If` block has executed, the `English` variable contains

```
English = "Seven Million Six Hundred Nine Thousand Five Hundred"
```

Going through the procedures that follow, the next `If` statement to prove `True` is `If (Tens >= 11 And Tens <= 19) Then`. So the statement `English = English & EngNum(11)` executes, making the `English` variable contain

```
English = "Seven Million Six Hundred  Nine Thousand Five Hundred Eleven"
```

No other `If...End If` statements execute. At the bottom of the loop where `LoopCount = LoopCount + 1`, the value of `LoopCount` value increases to `4`. The `Do While` loop repeats only while `LoopCount` is less than `4`, so execution falls through the `Loop` statement, executing the statement `NumWord = Trim(English) & " and " & Pennies & "/100"`. At that moment, `NumWord` (which is also the name of the function) gets `" and "`, the `Pennies` variable's value, and `"/100"` tacked on. The procedure then ends with an `End Function` statement. The value returned after calling `NumWord(7609511.98)` is

```
Seven Million Six Hundred Nine Thousand Five Hundred Eleven and 98/100
```

which, happily, is exactly right.

The procedure is designed to translate any number in the range of 0–999,999,999.99 where `NumWord(999,999,999.99)` returns

```
Nine Hundred Ninety Nine Million Nine Hundred Ninety Nine
            Thousand Nine Hundred Ninety Nine and 99/100
```

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If that's not big enough for you (because you print checks for a billion dollars or more), you could probably talk me into personally modifying the procedure to accommodate your needs.

You can download the `NumWord()` custom function from `www.coolnerds.com/vba`.

Getting away from the nitty-gritty details of how a complex procedure like `NumWord()` works, the most important concepts to remember are that you can create your own custom function in Access. To make the function freely available to all the other objects in your database, you just have to put the custom function in a standard module. After you do that, you can treat your custom function as though it were any built-in function.

I admit that I got into some fairly intense code here in this last example. If you're thinking that I just made up that procedure in my head and jotted it down like notes, you're way off-base. Programming rarely works that way. It's all a matter of breaking down a large problem into small pieces. Then you attack one piece of the problem at a time, getting each little piece to work before moving on to the next piece.

Along the way, you'll generally run into a whole lot of error messages because it's tough to write code that just works right off the bat. You really need to create, test, and debug every little piece of code as you go along. That brings me to *debugging* strategies for building your code so that it always works and never crashes. Debugging is what the next chapter is all about.

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Chapter 12

Testing and Debugging Your Code

In This Chapter

- Identifying types of errors (bugs)
- Conquering compile errors
- Dealing with logical errors
- Trapping and fixing runtime errors

Writing code is nothing like writing in English. When you write in English, you can make all kinds of spelling and grammatical mistakes, and the reader will still be able to get your meaning because a human reader has a brain that can figure out what you mean just by the context of the message you sent.

Unfortunately, writing code for a computer to read doesn't work that way. Computers don't have brains and can't figure out anything. When it comes to writing code, every letter of every word that you type has to be exactly right. Punctuation marks such as commas, periods, blank spaces, and so forth are critical and must be typed exactly as specified in the statement's syntax chart. If you have one small typographical error, the statement won't work.

Because it's nearly impossible to type every statement correctly every time, every program will have some *bugs* (errors) in it that will need to be corrected. The act of diagnosing and fixing these errors is *debugging,* and it's something that both beginning and seasoned programmers alike spend quite a bit of time doing. In fact, debugging is so commonplace that the VBA editor offers several debugging tools that are designed strictly for finding and fixing those bugs.

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Before I get to specific debugging tools and techniques, though, I think it helps to understand a little bit about what's going on behind the scenes as you're pounding away at the keyboard, trying to write some code that actually does something other than throw up error messages.

Understanding Compilation and Runtime

How a machine (like your computer) works and how your brain works are two entirely different things. All machines are basically dumb as rocks because they're just machines. Your computer is nothing more than a mindless machine that can pump a few billion instructions per second through a little toenail-sized wafer. No thought nor thinking nor awareness is involved in any of that. It's all just electrons zooming around at the speed of light in a controlled manner inside a small area.

Each of those zooming electronics creates a little friction as it travels, like when you rub the palms of your hands together really fast. That friction is what causes your computer to heat up.

Programmers often refer to how a machine processes information as *low-level*. For example, by the time information gets to the processor in your computer, that information is nothing more than a string of ones and zeroes, something like this:

```
0010101001100010101011010100001110101011010101101010101010101011
0101000111110101011000111110101010111000001010101100011001110001
1111010011000110001100111110000011101010111000111001101011011
```

In ProgrammerSpeak, you refer to the preceding as *low-level machine language* or *machine code*.

Human brains don't process information as ones and zeroes. Human brains process and communicate information by using higher-level concepts, like words, sentences, and paragraphs (not to mention pictures, sound, video, and so on.) Although you could write code by using just the 1 and 0 characters on your keyboard, it would not be easy nor quick — thus the invention of high-level programming languages.

A *high-level programming language* is one that uses words and sentences, rather than ones and zeroes, to control the computer. For example, VBA is a high-level language. When you want VBA to do something — like open a form named `MyForm` — you don't have to type out a bunch of ones and

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zeroes. Instead, you can type out a sentence that looks more like words, as follows:

```
DoCmd.OpenForm "MyForm"
```

The code that you type into the VBA editor is often referred to as *source code*. Every line of source code that you type needs to be *compiled* (translated) into a lower-level language that the computer can actually process. To keep you from writing a whole lot of code that makes no sense at all to the computer (which makes for extremely difficult debugging), the VBA editor quickly compiles each line of code you type the moment you finish typing that line.

Note that the VBA editor doesn't actually *run* (or *execute*) each line the moment you type it. Rather, it just compiles each line to make sure that when you do run the code, each statement in that code will work. When you type a line of code that VBA can't translate to lower-level machine code, the VBA editor gives you a `Compile error` message, like the example shown in Figure 12-1, to let you know that there's a problem with that line.

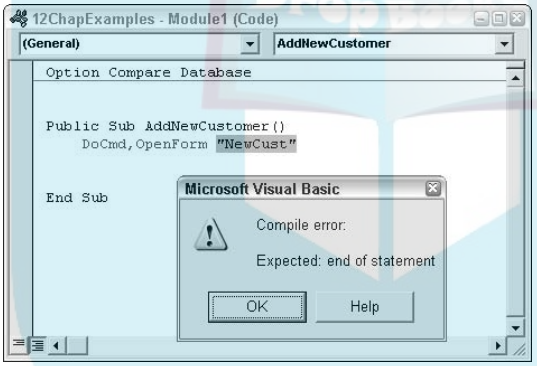

Figure 12-1: A sample compile error caused by a mistyped statement.

The real problem with the statement in Figure 12-1 is the comma (`,`) between `DoCmd` and `OpenForm`. That comma should be a period.

Programmers refer to the brief instant of time when your code is converted to a lower-level language as *compilation* or *compile time*. At compilation, the source code gets converted to the lower-level language that the computer needs to do what the code tells it to do. Later, when you actually run the code, the lower-level compiled code is what gets executed. The moment of time when the code is executed is *runtime*. Figure 12-2 illustrates the basic idea.

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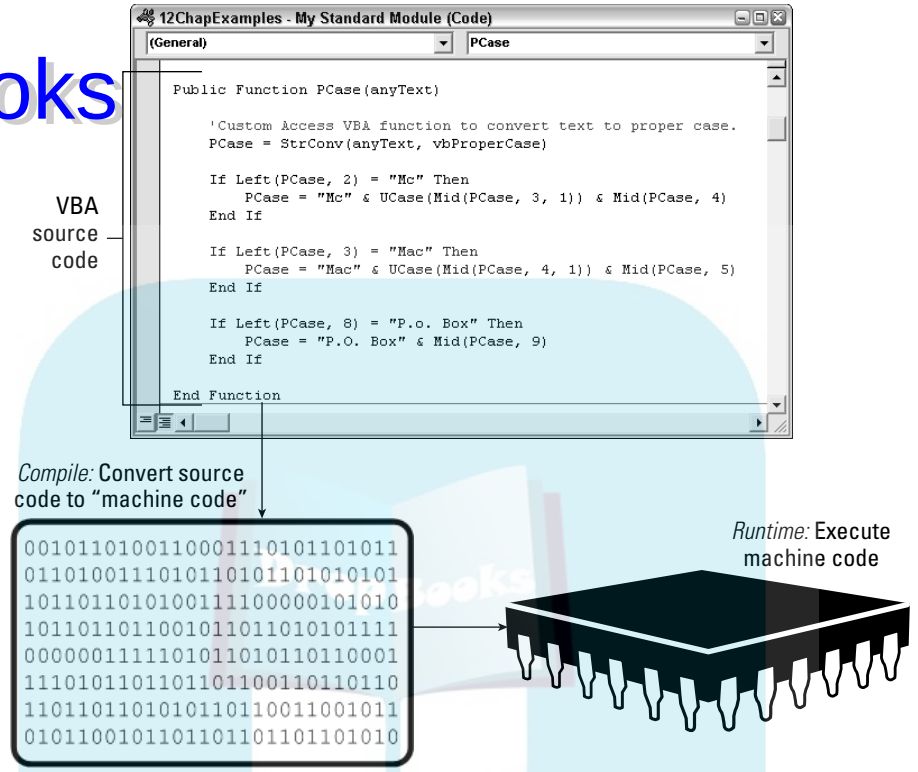

Figure 12-2: VBA source code gets compiled before being executed.

Considering Types of Program Errors

Errors in code can happen at any time in the create/compile/execute sequence. Programmers generally categorize the types of errors that they have to deal with as follows:

- **Compile errors:** Any problem that prevents the VBA editor from translating a line of source code to something executable generates a compile error, like the example shown in Figure 12-1. Such errors are usually syntax errors, meaning that you didn't obey the rules of syntax for that statement when typing the code.
- **Logical errors:** If your code runs without generating an error message but fails to do what you expected it to do, that's a logical error. In other words, the code can and does run, but the logic of the procedure isn't the right logic for achieving the desired result.
- **Runtime errors:** The code compiles okay, but when you run the code, it doesn't work. Instead, it pops a runtime error message onscreen, perhaps looking something like the example shown in Figure 12-3.

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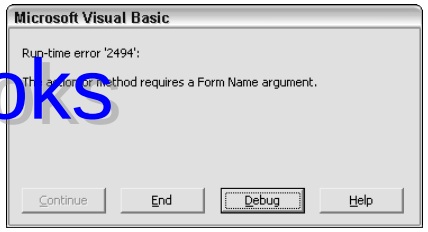

Figure 12-3: A sample runtime error message.

In the following sections, I look at the tools and techniques for dealing with each type of error, starting with the ubiquitous compile error, which rears its ugly head most often.

Conquering Compile Errors

The error messages that you'll face most often are the compile errors that happen in the VBA editor Code window. Every time you type a complete VBA statement and then move the cursor to some other line in the procedure, VBA quickly compiles that line of code. It doesn't actually *run* the code — it just compiles the one line of code to make sure that it will run when you run the procedure.

When you're first learning to program, compile errors might seem incessant and unstoppable. That's only because you're not yet familiar enough with the VBA language to write valid statements. And perhaps you haven't yet accepted the fact that when it comes to writing code, guessing *never* works. Either you know how to use a particular statement or you don't. You really have to know how to use all the help that's available to you — and use it well.

For more information on the various types of Help available to you in the VBA editor, read about understanding syntax in Chapter 3 and objects and collections in Chapter 5.

Compile error messages are rarely specific about what the problem is. For example, Figure 12-4 shows an `Expected: =` message, triggered by the `MsgBox` statement shown in the code. The error message tells you that the compiler was expecting to find an equal sign (=) in that statement, but it doesn't tell you where the equal sign should go. (If it knew where the equal sign belongs, it wouldn't have to show the message. It could just put in the equal sign for you.)

Clicking the Help button in the error message box rarely helps much. In this case, you'd just get a brief description of the problem and a few examples. However, the examples aren't necessarily relevant to the code that you're writing at the moment: They're just general examples.

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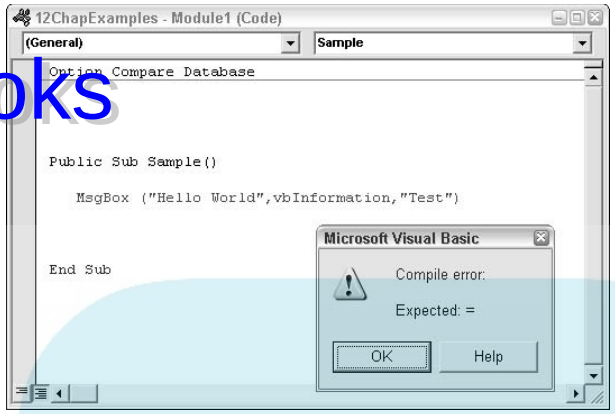

Figure 12-4: A sample compile error.

The only real solution is to find out the correct syntax for the `MsgBox` keyword. As it turns out, there are two syntactical forms of `MsgBox`. The first form, which you can use to just show a simple message with an OK button, is

```
MsgBox prompt
```

where *`prompt`* is the message to display in the box (either as literal text enclosed in quotation marks or the name of a variable that contains text).

The second form allows you to specify multiple arguments, such as the title, buttons, and icon to show. Using `MsgBox` in that manner requires the syntax

```
variable = MsgBox(prompt[,buttons][,title][,helpfile,context])
```

Here's where you get a clue as to the whereabouts of the missing equal sign. Because the `MsgBox` statement in the code uses multiple arguments, I have to use *`variable`* `=` at the left side of `MsgBox()`, with parentheses around its arguments. The value returned by `MsgBox()` will be a number indicating which button the user clicked, so the variable accepting that value should be declared as an integer. Thus the correction to the problem code in Figure 12-5 is the corrected code shown here:

```
Public Sub Sample()
   Dim Answer As Integer
   Answer = MsgBox("Hello World", vbInformation, "Test")
End Sub
```

The main point here is that the error message `Expected: =` really didn't tell you how to solve the problem. The only real solution to the problem was to find out how to use the `MsgBox()` statement and to see some examples of its use in Help. That's typical of compile error messages: They maybe give you a vague hint as to what the problem might be, but they never solve the problem for you nor even tell you how to solve the problem.

Take a look at some more common (and usually unhelpful) compile error messages and the solutions to the problems they've found.

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Expected: expression

The `Expected: expression` compile error means that while trying to compile the line, things went haywire because the compiler was expecting to find an expression but found nothing. This error happens if you leave one or more dangling commas at the end of a statement.

For example, the `MsgBox` statement in Figure 12-5 generated the compile error shown in that same figure. If you look closely, you might also notice that the closing parenthesis in the code is highlighted. The compile error is trying to help out by highlighting the place where it ran into the problem.

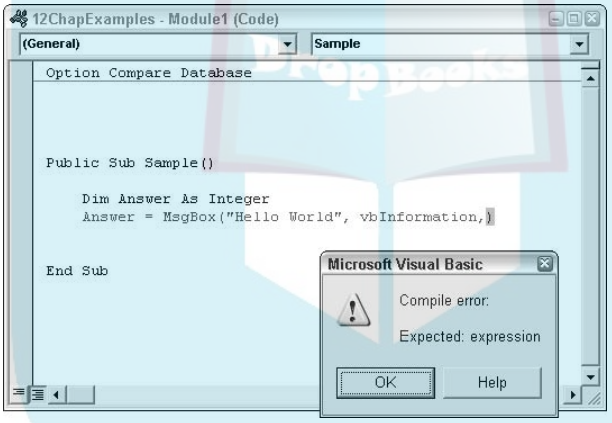

Figure 12-5: Sample `Expected: expression` compile error.

The problem with the line of code is that last comma, just to the left of the closing parenthesis. You use a comma only when you're about to type another expression into the list of arguments. In other words, while compiling that line of code, the compiler saw that last comma, expecting to find some expression after that comma, but instead found a closing parenthesis.

One solution to the problem would be to get rid of that last comma, as follows:

```
Answer = MsgBox("Hello World", vbInformation)
```

Or, you can leave the comma but add the argument that belongs in that spot. For example, in the `MsgBox` statement, the third argument is the title to show in the message box. To make that title read as `Test`, just go ahead and make that word the third argument (after the last comma), as follows:

```
Answer = MsgBox("Hello World", vbInformation,"Test")
```

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Expected: end of statement

The `Expected: end of statement` message is another common (and rarely helpful) compile error. Once again, all the message is telling you is that you have some sort of syntactical error in the statement. In Figure 12-6, the string literal `"MyForm"` at the end of the statement is highlighted, but that only tells you that the compiler got lost at that point.

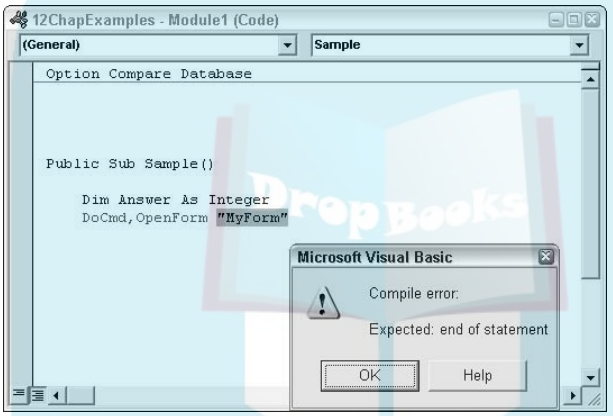

Figure 12-6: `Expected: end of statement` compile error.

The real problem with the statement in Figure 12-6 is the comma between `DoCmd` and `OpenForm`. The correct syntax for using the `DoCmd` object is

```
DoCmd.method...
```

where there's a period — not a comma — between the first two words. The fix for the problem would be to replace that comma with a period, as follows:

```
DoCmd.OpenForm "MyForm"
```

Expected: list separator or)

The `Expected: list separator or )` error message tells you that the compiler was expecting to find either a *list separator* (such as the comma that separates arguments in a function) or a closing parenthesis in the statement. In most cases, it will highlight where the problem began. For example, the following statement, when compiled, generates an `Expected: list separator or )` error message with the word `World` highlighted:

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```
Answer = MsgBox(Hello World, vbInformation,"Test")
```

The problem with the preceding line is that the words `Hello World` are supposed to be a string literal enclosed in quotation marks, but I forgot the quotation marks. The blank space between the words `Hello` and `World` has sent the compiler into a tizzy because it was expecting something else there. To correct the problem, put the quotation marks around the string literal, as follows:

```
Answer = MsgBox("Hello World", vbInformation,"Test")
```

With the quotation marks in place, the compiler can see that the entire string of text `"Hello World"` is the first argument, `vbInformation` is the second argument, and `"Test"` is the third argument.

Sometimes the `Expected: list separator or )` error message points out a missing parenthesis in a statement. For example, the following statement generates such an error message when compiled:

```
PCase = "Mc" & UCase(Mid(PCase, 3, 1) & Mid(PCase, 4)
```

It's rarely easy to see where a parenthesis needs to be added to a statement, especially if the statement contains lots of parentheses. But one fact is always true: Any statement that uses open parentheses must also use an equal number of closed parentheses.

Here's a little trick that programmers use to see whether they have the right number of parentheses. You start with the number 0 in mind. Then you read left to right. Each time you encounter an open parenthesis, add 1 to that 0. Each time you come to a closed parenthesis, subtract 1 from that number. By the time you get to the end of the line, you should be back to 0. If you end up at any other number, you have a problem.

As an example, Figure 12-7 shows the troublesome line above after counting open and closed parentheses. After you add 1 for each open parenthesis and subtract one for each closing parenthesis, you end up with 1. That shows that you either have one too many open parentheses or you're lacking one closed parenthesis.

Figure 12-7: Counting open/closed parentheses in a statement.

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Needless to say, you can't just stick an extra closing parenthesis into the statement at random. Rather, you need to understand the syntax rules of the various functions used in the expression. The example in Figure 12-7 uses two functions named `UCase()` and `Mid()`. Each function needs its own complete pair of parentheses.

The `Mid(PCase, 4)` function at the end of the statement is fine because the `Mid()` function requires exactly one open and one closed parenthesis. The larger `Mid()` function, `Mid(PCase, 3, 1)`, is also okay because it has one open and one closed parenthesis.

The problem is with the `UCase()` function. That larger `Mid(PCase, 3, 1)` function is actually the argument for the `UCase()` function, and there's no closing parenthesis for `UCase()`. That needs to be added right after the closing parenthesis for `Mid()`. Each of the `Mid()` functions also has a pair of open and closed parentheses. If you count the parentheses in the modified statement shown in Figure 12-8, the count ends up at 0, which is exactly what you want.

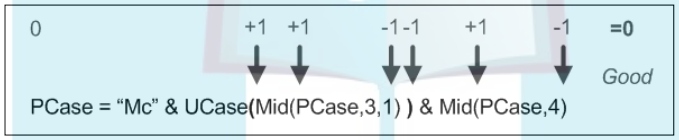

Figure 12-8: Equal number of open/closed parentheses.

Regardless of what compile error message you get, you have to fix the problem before you can even run the procedure. Don't expect the compile error message to pinpoint the solution for you. The message in a compile error is often too vague and too general for that. In most cases, your only recourse is to look up the correct syntax in Help (or through the Object Browser) and learn the correct syntax for whatever you're trying to accomplish.

Dealing with Logical Errors

Even if your code compiles and runs without generating an error message, the code isn't necessarily perfect. Your code can also contain logical errors. Unlike a compile error, which is an error in syntax or a typographical error, a logical error is an error in your thinking (logic). The computer will always do exactly what the code tells it to do, even if you tell it to do the wrong thing.

For example, say you meant to write a line of code to open some form, but you accidentally wrote the code to close the form. When you run the code, the computer will (of course) close the form — not open it. The computer

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would never look at your code and think to itself, "Hmmmm. I bet she meant to open a form here, so I'll do that instead." Computers just don't work that way. The computer always does *exactly* what the code tells it to do.

Pinpointing logical errors in your code is often difficult mainly because when you run a procedure, everything happens in less time than it takes to blink your eyes. Often it helps to take a look at what's going on behind the scenes while the code is running. The VBA editor provides a few tools that allow you to see what's going on behind the scenes.

Checking on variables with Debug.Print

In earlier chapters, you can see examples of using the VBA editor Immediate window to test procedures and try out expressions. For example, typing a simple expression like **? 1+1** (What is one plus one?) results in 2, which is the sum of one plus one. Typing the expression `? CurrentProject.AllForms.Count` displays the number of forms in the current database.

You can also force your code to display information in the Immediate window. However, in code, you use a `Debug.Print` expression rather than a `?` expression to make the code print to the Immediate window. This is an easy way to watch what's happening to variables behind the scenes while your code is running.

The real beauty of `Debug.Print` is that it allows you to write a little code, test it to see what's going on, and make sure that all is well before writing more code. For example, in Chapter 11, I show you an example of a function named `PCase()` that can convert any text to proper noun case (the first letter of each word in uppercase).

When you look at a completed procedure like that, you might think that the programmer just typed it out like typing a note, and the thing just ran perfectly right off the bat. That's not even close to how programmers really work. A programmer knows that every line of code is just one step in the overall procedure. For the procedure as a whole to work, you need to make sure that each individual piece is doing exactly what you think it's doing.

To write the `PCase()` function, I actually started out by just writing this:

```
Public Function PCase(anyText) As String
   PCase = StrConv(anyText, vbProperCase)
   Debug.Print "PCase = " & PCase
End Function
```

That was the entire function, at first. To test it, I typed **? PCase("MARVIN DODoskY")** into the Immediate window and pressed Enter. When I did, the `Debug.Print` statement in the code displayed the following in the Immediate window:

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```
PCase=Marvin Dodosky
```

To test it again, I typed **? PCase("123 OAK TREE LANE")** into the Immediate window and got back `PCase = 123 Oak Tree Lane`. At this point, I knew that the basic problem — converting the first letter of each word to uppercase and lowercasing all other letters — was solved.

Granted, having the procedure show a small result like that in the Immediate window is of no value to a potential user of the function. But to me — as the *programmer* — it told me that after the statement `PCase = StrConv(anyText, vbProperCase)` executes, the `PCase` variable contains the passed text with the first letter of each word capitalized. At that point, I knew that the basic problem of capitalizing the first letter of each word was solved, so I could then move onto writing code to solve the next problem.

I decided to tackle the Mc problem next. First, I had to figure out how to tell the procedure that if the first two letters were *mc,* change `PCase` so that the first and third letters are uppercase. I already knew that I could use the `Mid()` function to grab any portion of any string, and that I could use the `UCase()` function to convert any letter to uppercase.

So I typed out the `If...Else...End If` block of code to handle any string that starts with the letters Mc, shown as follows, and moved the `Debug.Print "PCase = " & PCase` statement below that, as follows:

```
Public Function PCase(anyText) As String
   PCase = StrConv(anyText, vbProperCase)

   If Left(PCase, 2) = "Mc" Then
      PCase = "Mc" & UCase(Mid(PCase, 3, 1)) & Mid(PCase, 3)
   End If

   Debug.Print "PCase = " & PCase

End Function
```

To test my progress, I typed into the Immediate window **? PCase("MCDONALD")** and pressed Enter. The Immediate window showed `PCase = McDdonald`. Oops, that should have been McDonald — not McDdonald (with two d's). This is a logical error in the sense that the code ran without generating any error messages. The problem is with the logic of how I handled the problem.

After studying the code more closely, I realized that the last `Mid` statement — `& Mid(PCase,3)` — was wrong. That should be `Mid(PCase,4)`. So I changed the code, as follows:

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```
Public Function PCase(anyText) As String
   PCase = StrConv(anyText, vbProperCase)

   If Left(PCase, 2) = "Mc" Then
      PCase = "Mc" & UCase(Mid(PCase, 3, 1)) & Mid(PCase, 4)
   End If

   Debug.Print "PCase = " & PCase

End Function
```

Once again, I tested the procedure by entering **? PCase("MCDONALD")** into the Immediate window. I got back the following:

```
PCase = McDonald
```

in the Immediate window. Now I knew that the *Mc* problem was solved. Onto the next problem — dealing with the *Mac* last names. From there on out, it was more of the same. I'd write a little code, test my progress so far, and fix any problems that I discovered. By making sure that each piece of the puzzle worked at each step in the process, I was able to finally create a custom function that did what I wanted it to.

The much larger `NumWord()` procedure from Chapter 11 was harder to write, of course. Again, it was all a matter of doing a little at a time, testing my progress, fixing all compile and logical errors, and then moving on to the next problem. Basically, I started out by declaring variables, setting up the array, and typing the first statement, followed by a couple of `Debug.Print` statements. Here's the basic idea; to save space, I put an ellipsis (`...`) in place of most of the array element definitions:

```
Function NumWord(AmountPassed As Currency) As String
   'Declare all variables and arrays.
   Dim English As String, strNum As String
   Dim Chunk As String, Pennies As String
   Dim Hundreds As Integer, Tens As Integer
   Dim Ones As Integer, LoopCount As Integer
   Dim StartVal As Integer, TensDone As Boolean
   Dim EngNum(90) As String
   EngNum(0) = ""
   EngNum(1) = "One"
   EngNum(2) = "Two"
   EngNum(3) = "Three"
      '...
   EngNum(80) = "Eighty"
   EngNum(90) = "Ninety"

   strNum = Format(AmountPassed, "000000000.00")
   'strNum is original number converted to string

   Debug.Print "AmountPassed = " & AmountPassed
```

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```
    Debug.Print "strNum = " & strNum

End Function
```

To test my progress at this point, I typed **? NumWord(1234. 56)** into the Immediate window and then pressed Enter. The Immediate window returned this:

```
AmountPassed = 1234.56
strNum = 000001234.56
```

Now I could see what I really had to work with before writing more code. Also, I knew that because `strNum` is a string, I could use the built-in `Mid()` function to isolate portions of the string and still use `AmountPassed` to check for other things, like how large a number was being translated to English.

Knowing that I had `AmountPassed` and `strNum` to work with, I then wrote a little more code for the procedure, tested that, and worked out any kinks until all was well to that point. And so it goes. You write a little code, maybe use the Help to work out any compile errors, test the code, fix any errors in logic, and then you're on to the next bit of code.

If I'd tried to just type the whole procedure in one fell swoop before testing it, any problems would have been more difficult to find because they could be anywhere in the code. By writing a little, testing a little, and debugging a little along the way, I was gradually able to solve all the problems and come up with a procedure that actually works.

The only purpose of using `Debug.Print` in the code is to give yourself some feedback as to what's going on behind the scenes as that code is running. After any problems are solved at a given point in a procedure, you can delete any `Debug.Print` statements that you don't need any more. After all, the `Debug.Print` statements won't be of any value to the user of your custom function. `Debug.Print` statements serve only as a programmer's debugging tool.

Slowing down code

Using `Debug.Print` in code to get a little feedback as to what's happening in your procedure is helpful, but when you run the procedure, it will still execute in an eyeblink's time. To get things to slow down, you can set breakpoints in your code via the VBA editor Code window. A *breakpoint* in your code doesn't actually make the code run in slow motion; rather, it forces the VBA editor to suspend execution of code at that point so that you can explore the values of variables or whatever in the Immediate window.

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Testing Function and Sub procedures

The syntax for calling a procedure from code, as well as from the Immediate window, is different from the syntax for calling a function. To run a procedure from the Immediate window, just type the procedure's name (without the parentheses) and press Enter — for example, if your module contains a `Sub` procedure declared as `Sub`.

To test a custom `Sub` procedure from the Immediate window, just type the procedure's name without any quotation marks and then press Enter. To test a function from the Immediate window, use the syntax `? functionName(arguments)` where *`functionName`* is the name of your custom function, and *`arguments`* represents any sample data that you want to pass to the function for testing. After the function runs, the Immediate window will display the value returned by your function.

To set a breakpoint in a procedure, follow these steps:

1. **Make sure that the procedure you want to test is open and visible in the Code window.**
2. **Move the cursor to the line where you want to suspend code execution; then do whichever of the following is most convenient at the moment:**
   - Right-click the line and choose Toggle➪Breakpoint.
   - Choose Debug➪Toggle Breakpoint from the VBA editor menu bar.
   - Click the Toggle Breakpoint button on the Debug toolbar.

     If the Debug toolbar isn't visible in your VBA editor, choose View➪Toolbars➪Debug from the menu bar to make that toolbar visible.

After the breakpoint is set, test your code normally from the Immediate window. Your code will execute at its usual blazing speed until execution reaches the line that you defined as a breakpoint. Instead of being compiled and executed, the breakpoint line of code gains a bright yellow highlighter in the Code window and won't actually execute until you press F8. Basically, this means that you can make your code slam on the brakes and go into *step mode,* where you miraculously take over all code execution yourself.

Of the several ways to use step mode, just take a look at the easiest and most common way to set a breakpoint and use step mode. Suppose that while creating the `NumWord()` procedure, I want to take a look at all my variables just before the line that reads `strNum = Format(AmountPassed, "000000000.00")` executes. In the Code window, I'd right-click that line and choose Toggle➪Breakpoint. Then I'd run the function and pass some huge number to it, as a test, by entering something like **? NumWord(123456789.00)**.

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The procedure would run at its usual blazing speed up to the breakpoint line and then slam on the brakes. If I wanted to take a quick look at some variable defined in the code before the breakpoint line executes, I could ask the Immediate window by typing **? *variableName***. For example, if I enter **? strNum** into the Immediate window while the code is suspended, I get nothing in return because `strNum` is empty before the breakpoint line executes. Still, getting nothing in response to the `? strNum` expression is confusing. Here's a much quicker and easier way to check out the contents of your procedure's variables: the *Locals window*.

Using the Locals window

While your code is suspended in a breakpoint and in step mode, you can easily check the value and data type of every variable defined in your code up to that breakpoint. This saves you from having to type a bunch of `? variableName` statements in the Immediate window. To see an overview or all the variables in the procedure, just choose View➪Locals Window from the VBA editor menu bar or click the Locals Window button on the Debug toolbar.

The Locals window will open, showing the name, value, and data type of every variable defined up to that point in your code. Figure 12-9 shows an example where I opened the Locals window while code was suspended in the sample `NumWord()` procedure. There I can see the name, value, and data type of every variable that exists in `NumWord()` just before the breakpoint line executes.

In the Locals window, I can easily see the `strNum` variable that I previously checked on in the Immediate window. The Locals window lets me know that the variable is empty by showing `""` as its value and `String` as its data type. That's all true and correct because a `Dim` statement near the top of the procedure has already declared `strNum` a string variable.

Moving and sizing editor windows

Like all windows in the VBA editor, you can anchor the Locals window to any edge of the program window. While it's anchored, you can change its height or width by dragging the border just above its title bar. You can also drag it by the title bar toward the center of the screen to make it a free-floating window. To put the Watch window back into hiding, click the Close (X) button in its title bar.

To get the Immediate and Locals windows to stack up as they are in Figure 12-9, first make sure that both are open. Drag one window's title bar right to the middle of the other's title bar and then release the mouse button. To resize them, drag the border line that separates the two panes up or down or drag the leftmost border left to right. To reverse the stack order of the two panes, drag the bottom pane's toolbar up to the middle of the top pane's window.

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The Locals window shows the name, value, and data type of every variable created prior to the currently highlighted line of code. And knowing about all your variables at an exact moment of time can be a great aid to debugging your code. Keep reading because things really get good when you learn to use the step mode.

Stepping through code in step mode

Say you've set your break point, code execution has stopped at the break-point line, and maybe you're looking at variables in the Locals window. The real question is, "What next?" The answer is that you basically have four choices:

- **To execute the currently highlighted line of code (only):** Press F8 or choose Debug➪Step Into.
- **To skip the currently selected line without executing it:** Press Shift+F8 or choose Debug➪Step Over.
- **To execute all lines of code up to — but excluding — a specific line of code:** First click the line to which you want execution to run. Then press Ctrl+F8 or choose Debug➪Run to Cursor from the menu bar.
- **To bail out of break mode:** Press Ctrl+Shift+F8 or choose Debug➪Step Out.

The best way to use step mode, as a beginner anyway, is to just press F8 to execute the currently selected line of code. When you do so, the line executes. Any changes to variables made by executed statements appear in the Locals window. For example, if I press F8 at the moment shown in Figure 12-9, the `strNum` variable's value in the Locals window changes from `""` (nothing) to `"123456789.00"` because the executed statement gave `strNum` a value.

Even better, you can sit there and just tap the F8 key to watch the procedure execute one line at a time. You can actually see how code execution jumps over `If...End If` statements and how it goes around in circles in a loop. If the Locals window is open, you can watch variables appear and receive values just as they do when the code is really executing. It's code execution in super-slow motion, where you control the speed of things by tapping the F8 key.

If the code that you're debugging affects an open form in Access, you might notice the Access program window flash onscreen as the code executes. If you want to take a look at that open form — without losing your place in the VBA editor — just click the form's taskbar button or press Alt+F11 to switch back and forth between Access and the VBA editor.

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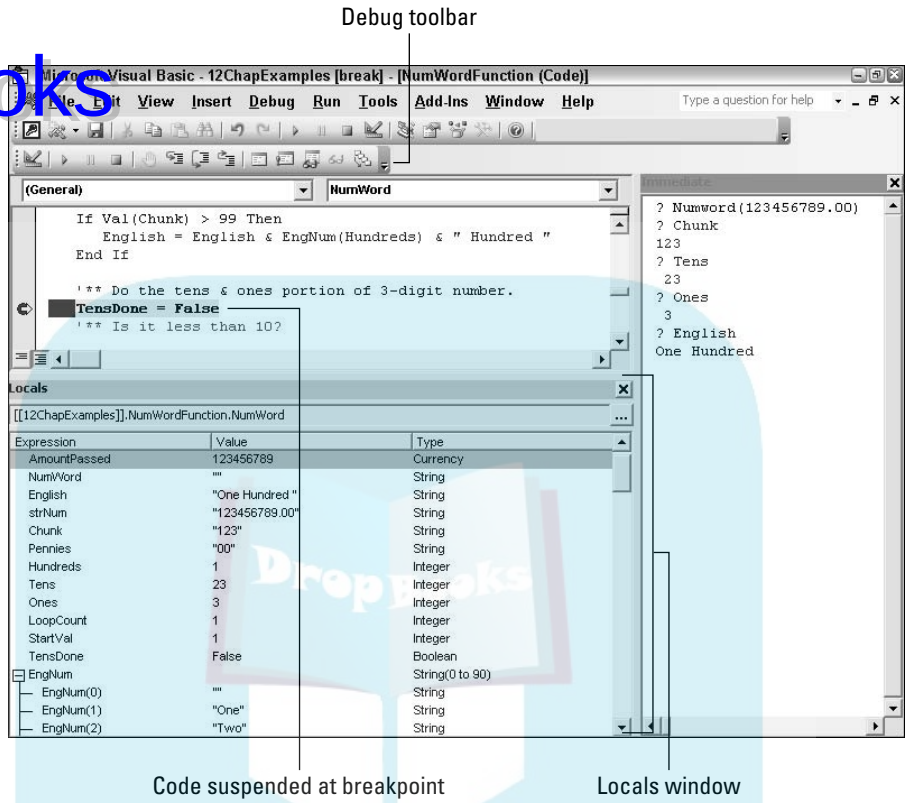

Figure 12-9: Checking out the locals in step mode.

Getting back to normal in the Code window

When you finish debugging or just want to start over with a clean slate, do one of the following:

- **To get out of step mode:** Press Ctrl+Shift+F8 or choose Debug➪Step Out. Code execution will stop, and things will be back to normal.
- **To remove a breakpoint:** Right-click the line and choose Toggle➪Breakpoint.
- **To clear all breakpoints from your code:** Choose Debug➪Clear All Breakpoints.
- **To clear the Locals window of its value:** Right-click any text within the window and choose the Reset option from the shortcut menu.

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Closing the VBA editor window also terminates the step mode. For instance, if you choose File➪Close and Return to Microsoft Access while in step mode, you'll see the prompt `This command will stop the debugger` (see Figure 12-10). This means that if you click OK, the Visual Basic editor will close, all breakpoints will be cleared, step mode will be terminated, and you'll be returned to the Access program window. The next time you open the module, it will be free of breakpoints and in normal mode rather than step mode. (Clicking Cancel closes the dialog box without doing anything to the code. Clicking Help shows some confusing information about the dialog box.)

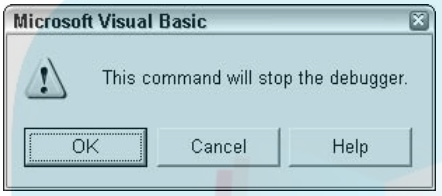

Figure 12-10: Exit options when closing in step mode.

Wrestling Runtime Errors

Some VBA errors are caused by environment conditions rather than anything that's wrong with the logic of the code or a compile error. As an extreme example, take a look at an environmental condition that could prevent code from executing. Say you drag and drop some icons from a folder to the icon for your floppy drive in My Computer. If there's no floppy disk in the drive when you release the mouse button, you create an environmental condition in which no program could complete its task. There's just no way any program in the world can copy files to an empty floppy disk drive!

In your VBA code, environmental conditions can be much more subtle than the missing floppy disk example. A more common example would be a line of code that attempts to move the cursor to a specific control when the form isn't even open. For example, the following line of code attempts to move the cursor (`SetFocus`) to a control named `StateProv` on an open form named Customers (`Forms![Customers].SetFocus`).

```
Forms!Customers.[StateProv].SetFocus
```

The preceding line of code will execute just fine provided that the form named `Customers` actually is open in Form view when the line executes. If the form named `Customers` is open in Design view when that line executes, a runtime error like the one in Figure 12-11 occurs.

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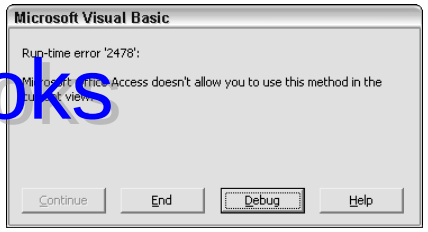

Figure 12-11: A sample runtime error message.

Responding to a runtime error

When your code generates a runtime error and you're given the choices shown in Figure 12-11, you have three or four choices:

- **Continue:** If code execution was suspended when the error occurred, clicking the Continue button will resume execution at the next line of code in the procedure. This option is disabled (not available) in most cases.
- **End:** Clicking this button terminates code execution and takes you back to the Code window without going into step mode.
- **Debug:** Clicking this button stops code and takes you back to the Code window. The line of code that generated the error is highlighted, and you're in step mode.
- **Help:** Clicking this button provides brief help with debugging VBA code.

Most often, you just click End to get back to your code normally or click Debug to get back to your code with the faulty line highlighted and in step mode. If the problem is something that you can fix in that particular line, you can just modify the line and try again although it often takes a little more brain power than that to figure out what's really wrong.

For example, say upon inspecting the code that caused the runtime error, you discover that the line above the faulty line opens the `Customers` form in Design view (`acDesign`) rather than the normal Form view, as follows:

```
DoCmd.OpenForm "Customers", acDesign
Forms!Customers.[StateProv].SetFocus
```

Even though the error message was generated by the second line, the real problem is in the first line. The fix is to change `acDesign` to `acNormal` in the top line, as follows, so that the second line can do its job of moving the cursor to the `StateProv` control of that form:

```
DoCmd.OpenForm "Customers", acNormal
Forms!Customers.[StateProv].SetFocus
```

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After you make the correction, you can just run the entire procedure again to test it out.

If seeing the error is difficult, you can still use step mode to watch what's going on in your code and in Access. For example, in your code, you could set a breakpoint a few lines above the line that's causing the error. Then step through your code one line at a time, pressing the F8 key. After you press F8, you can press Alt+F11 to see what (if anything) happened in Access as a result of that statement's execution. Then press Alt+F11 again to return to VBA, press F8 to execute the next statement, and then press Alt+F11 again to see that statement's effect on Access. Just keep doing that, and eventually you'll discover which statement is really causing the situation that's making the faulty line fail.

Unfortunately, not all runtime errors are the kind of things that you can fix by correcting your existing code. Some runtime errors are caused by peculiar situations in the environment, like the missing floppy disk in the copy-to-floppy example, and there's really no way to write code to fix that error. The best that you can do with those kinds of errors is to trap them and give the user some kind of more friendly feedback and options than the VBA runtime error message box would provide.

Trapping runtime errors

As you can see in the preceding example, when a runtime error occurs, you get two pieces of information in the message box that appears (see Figure 12-12). Note the error number (referred to as `Err.Number` or *the Number property of the Err object* in programmer lingo). That number is of no value to a human user but can be handy for a programmer. The other piece of information that the error message provides is the error description, referred to as `Err.Description` in VBA. The error description is the text that (vaguely) describes why the error occurred.

When you see a runtime error on your screen, two things have actually happened. The obvious first thing is the message onscreen. But behind the scenes, VBA has raised a runtime error, and the `Err` object has also received two values that describe that error. Those values are stored in the `Number` and `Description` properties of the `Err` object (expressed as `Err.Number` and `Err.Description` in VBA code). Just like you can see the number and description of an error by looking at the message onscreen, VBA can "see" that same information by looking at the contents of the `Err.Number` and `Err.Description` properties.

Trapping runtime errors is basically a matter of anticipating what runtime errors might occur when the code runs, and also writing code to gracefully handle each type error without causing the whole procedure to crash. The code that you write to deal with runtime errors is often referred to as an *error handler* because that's exactly what the code does — it handles the error in some way without causing the whole procedure to crash.

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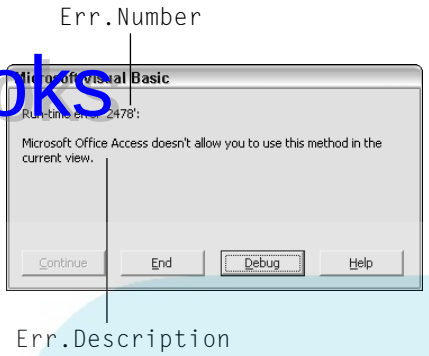

Figure 12-12: Err.Number and Err.Description in a runtime error.

To create an error handler, you first need to add an `On Error` statement to your code, preferably just after the `Sub` or `Function` statement that marks the beginning of the procedure. Use one of the following three different ways to create an `On Error` statement:

- `On Error GoTo label`: When an error occurs as a statement runs, code execution jumps to the section of code identified by label within the same procedure.
- `On Error Resume Next`: If an error occurs as a statement runs, that statement is ignored, and processing just continues with the next line of code in the procedure.
- `On Error GoTo 0`: Disables any previous `OnError GoTo` or `On Error Resume Next` statements so that future runtime errors are handled by VBA rather than your own code.

The `Resume` statement can be used in any error-handling code to tell VBA exactly where to resume code execution after the runtime error occurred. The syntax for the `Resume` statement can take any of the following forms:

- `Resume`: Causes VBA to re-execute the statement that caused the error. You want to use this statement only if the error-handling code fixed the problem that caused the error in the first place. Otherwise, executing the same statement again just causes the same error again.
- `Resume Next`: Causes execution to resume at the first statement after the statement that caused the error. The statement that caused the error does not execute at all.
- `Resume label`: Causes execution to resume at the label specified.

Code created by Control Wizards and macro conversions might already have error-handling code written into it. For example, say you're working on a form in Design view. You add a command button to the form from the Toolbox while the Control Wizards button is pushed in. As soon as you drop the button in

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the form, the Command Button Wizard opens so that you can define the button's appearance and behavior one step at a time.

Suppose you go through the wizard and create a button that closes the form. You tell the wizard to name the button, and then you click Finish to complete the wizard. Your form now has a button on it. Although it's not readily apparent in Design view, what the Command Button Wizard really did was write some VBA code that tells the button what to do. To see the code that the wizard wrote, right-click the new button and choose Build Event. The Code window will open showing the code that the wizard wrote for the button's `On Click` event, as in Figure 12-13.

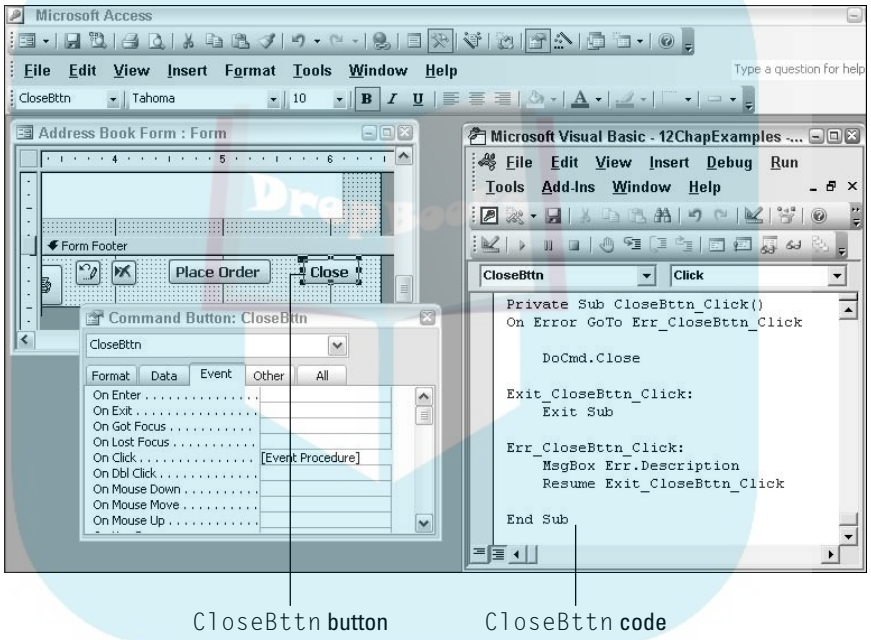

Figure 12-13: `CloseBttn` button and `On Click` event code.

In the `CloseBttn_Click()` procedure that the wizard created, only the line `DoCmd.Close` closes the form. Technically, the code would work just fine if `DoCmd.Close` were the only statement in the entire procedure, but the wizard always adds error handling to the code that it generates. And most of the lines in the procedure are actually there to handle errors in case some problem arises that prevents the form from closing.

Near the top of the procedure, you see the statement `On Error GoTo Err_CloseBttn_Click`. When executed, that statement tells VBA, *If a runtime error occurs while this procedure is executing, don't "crash." Instead, stop what you're doing and resume execution at the* `Err_CloseBttn_Click` *label.*

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Then the code tries to execute the next statement, `DoCmd.Close`. If VBA is able to close the form when executing that statement, no runtime error occurs. Instead, the code execution drops to the next actual statement in the procedure, `Exit Sub`, which ends the procedure. In other words, if no error occurs when `DoCmd.Close` executes, the code runs and ends normally without calling upon any error-handling code.

However, if a runtime error does occur when VBA tries to execute the `DoCmd.Close` statement, the procedure doesn't crash. Rather, it passes control to the first statement under the `Err_CloseBttn_Click:` label. There, the `MsgBox Err.Description` statement shows the description of the error in a simple message box, and code execution drops to the line that reads `Resume Exit_CloseBttn_Click:`. The first statement under that label reads `Exit Sub`. When executed, that statement just ends the procedure normally.

A key component of understanding how error handling works is realizing that any line that ends with a colon is a label in code. A label is different from a regular line of code in that it's not an instruction to the computer to do something. Rather, its just a placeholder in code to which `GoTo` and `Resume` statements can pass control. The sample `CloseBttn_Click` procedure has two labels, pointed out in Figure 12-14.

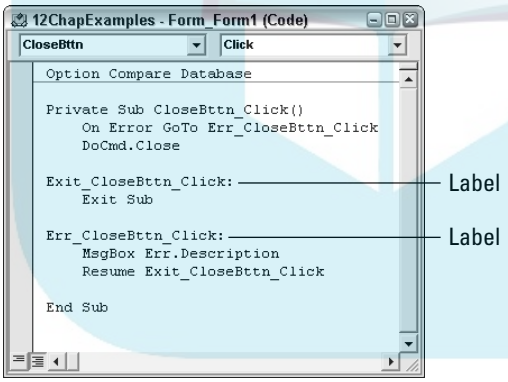

Figure 12-14: Lines ending with a colon (`:`) are labels, not statements.

A label text can be any text at all, provided that it starts with a letter and contains no blank spaces. Using the word `Err` and an underscore, followed by the procedure name and a colon, is customary but not required. However, the colon at the end of the label is mandatory because it's the only character that lets the compiler know that the line is a label rather than a regular VBA statement.

Writing your own error handlers

When writing your own code and your own error handlers, it's not realistic to assume that you can anticipate every possible environmental condition that

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might cause the procedure to crash. For starters, you can just write the basic code to trap the error, display the error number and description in a simple message box, and then exit the procedure gracefully.

Assume that you've already written a procedure, and now you want to add some error-handling to that procedure. Exactly what the procedure does is irrelevant, so rather than show a bunch of VBA statements here, I'll just refer to the existing statements as the main body of code below. First, you need to add an `On Error...` statement at or near the top of the procedure so that any runtime error that occurs during execution branches control to some label.

Next, you need to define the label to which the `On Error` statement refers. Typically, you can add an `Exit Sub` or `Exit Function` statement just above the `End Sub` or `End Function` procedure that's currently in the code. That will ensure that if the code runs without generating an error, code execution won't fall through to the error handler and make you think that there's an error when there isn't.

Finally, just above the `Exit Sub` or `Exit Function` statement at the bottom of the procedure, add whatever label you specified in your `On Error` statement. It's rarely possible to anticipate every conceivable error message. For starters, you can just have the error handler display the error number and description in a standard message box. Here's the basic skeleton of what the starting error-handling code might look like in a `Sub` procedure (where the main body of code represents any number of VBA statements that define what the procedure does normally):

```
Sub anySub()
   On Error GoTo MyErrorHandler

   Main body of code
   Main body of code
   Main body of code

   Exit Sub
MyErrorHandler:
   Dim Msg As String
   Msg = Err.Number & ":" & Err.Description
   MsgBox Msg
End Sub
```

The same skeleton structure works in a function. You just have to replace the `Exit Sub` with `Exit Function`, as follows:

```
Function anyFunction()
   On Error GoTo MyErrorHandler

   Main body of code
   Main body of code
```

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```
    Main body of code

    Exit Function
MyErrorHandler:
    Dim Msg As String
    Msg = Err.Number & ":" & Err.Description
    MsgBox Msg
End Function
```

Take a look now at how even a simple generic handler like the preceding example can be adapted to deal with unexpected runtime errors. Suppose that somewhere in the main body of code is a statement that attempts to write some data from a query to an HTML file on a floppy disk. For instance, the following VBA statement copies data from a query named `OrderSummary` to a file named `Order Summary.html` on a floppy disk:

```
DoCmd.OutputTo acOutputQuery, "OrderSummary", _
            acFormatHTML, "A:\Order Summary.html"
```

Figure 12-15 shows that code added to the main body of the basic skeletal structure for error handling. Once again, `...Main body of code...` refers to any other numbers of statements in the same procedure.

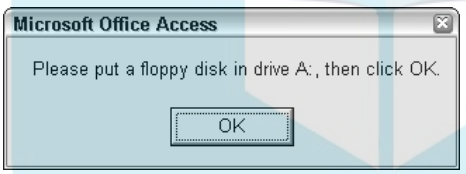

Figure 12-15: Statement writes a file to a floppy.

Suppose you run the procedure without a floppy disk in the floppy drive. Naturally, when VBA tries to execute the statement that tries to write to a floppy disk, the empty floppy drive is going to cause a major environmental problem. That problem, in turn, is going to raise an error message. However, by the time the `DoCmd.OutputTo...` statement executes, the `On Error GoTo MyErrorHandler` code has already been executed. So rather than just crash at the `DoCmd.OutputTo...` statement, execution gets passed down to the `MyErrorHandler` label.

The `MyErrorHandler` code then creates a little message string from the `Number` and `Description` properties of the `Err` object. That message is then displayed onscreen, as in Figure 12-16.

As a programmer, you've just learned something very useful about your procedure. When a user tries to run this procedure without a floppy disk in the drive, Access raises `Err.Number 2302` (the number at the start of the message). As a programmer, you also don't care about anything else, other than finding some graceful way of handling this situation that doesn't leave the

poor user at a complete loss as to what to do next. As a programmer, you click OK and get back to doing what programmers do — writing code.

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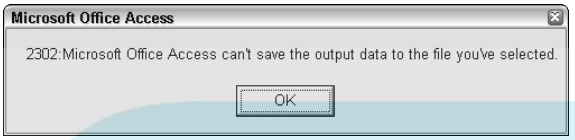

Figure 12-16: Custom error message for the missing floppy (error 2302).

You also know that when any error occurs in your code, execution will always transfer to the `MyErrorHandler` label. To trap that 2302 error, you can place an `If...End If` statement right there under the label that reads, *If the error that got us here was error number 2302, then... (handle it this way)*. Here I'll start (as I always do in real life) just by typing the `If...End If` lines for trapping error 2302. These need to be inserted just under the label `MyErrorHandler:`, as shown in boldface in the following. (I've also added a couple of comments to the code.)

```
'Everything below here is Error handler stuff.
MyErrorHandler:

   'Trap "missing floppy" error (2302).
   If Err.Number = 2302 Then
      'Deal with missing floppy problem.
   End If

   'Just show error number and description, then end Sub.
   Dim Msg As String
   Msg = Err.Number & ":" & Err.Description
   MsgBox Msg
End Sub
```

So now you have an `If...End If` block of code in your handler that can deal specifically with error 2302 when it arises. I suppose the smart thing to do would be to show a message that tells the user to put a floppy in the floppy drive, click an OK button, and let the code take another shot at copying to the floppy. The following code sample shows the appropriate code added between the `If...End If` statements for error 2302:

```
   'Everything below here is Error handler stuff.
   MyErrorHandler:
   'Trap "missing floppy" error (2302).
   If Err.Number = 2302 Then
      'Deal with missing floppy problem.
      'Tell user what to do.
```

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```
        Dim ErrMsg As String
        ErrMsg = "Please put a floppy disk in drive A:."
        ErrMsg = ErrMsg + " Then click OK. "
        MsgBox ErrMsg

        'Re-execute line that copies to floppy.
        Resume
    End If

    'Just show error number and description, then end Sub.
    Dim Msg As String
    Msg = Err.Number & ":" & Err.Description
    MsgBox Msg

End Sub
```

Notice how there's now a block of code that's executed if (and only if) error number 2302 is raised (`If Err.Number = 2302 Then...End If`). Within that block of code is more code written specifically to handle that error. If the user runs the procedure without a floppy in the drive, the user first sees the message box defined in the code, which looks like Figure 12-17 on the user's screen.

For starters, your custom error-handler has replaced the generic error message `Microsoft Office Access can't save the output data to the file you've selected` to a very specific instruction telling the user exactly what to do. That's because the message being displayed now is the one defined by these lines of code within the `If Err.Number = 2302 Then...End If` block:

```
ErrMsg = "Please put a floppy disk in drive A:."
ErrMsg = ErrMsg + " Then click OK. "
MsgBox ErrMsg
```

When the `MsgBox ErrMsg` statement executes and displays the message onscreen, code execution halts until the user clicks OK. (Not because of anything special I did but rather because that's how `MsgBox...` statements always execute.) When the user does as instructed and clicks OK, the next statement executed is

```
Resume
```

That statement forces execution to try the error-generating line again (`DoCmd.OutputTo...`). This time, because there is a floppy disk in the drive, the statement will run just fine. Code execution will then resume normally under that line, and everything will be just as though the error never occurred.

And that's what handling runtime errors gracefully is all about. By adding a general error-handler to the code, you're able to trap — and take a look at — whatever runtime errors that particular procedure might generate. When you find a specific runtime error, find some way of handling it that allows the code to keep running and keep working rather than just leaving the user staring dumbfounded at the screen.

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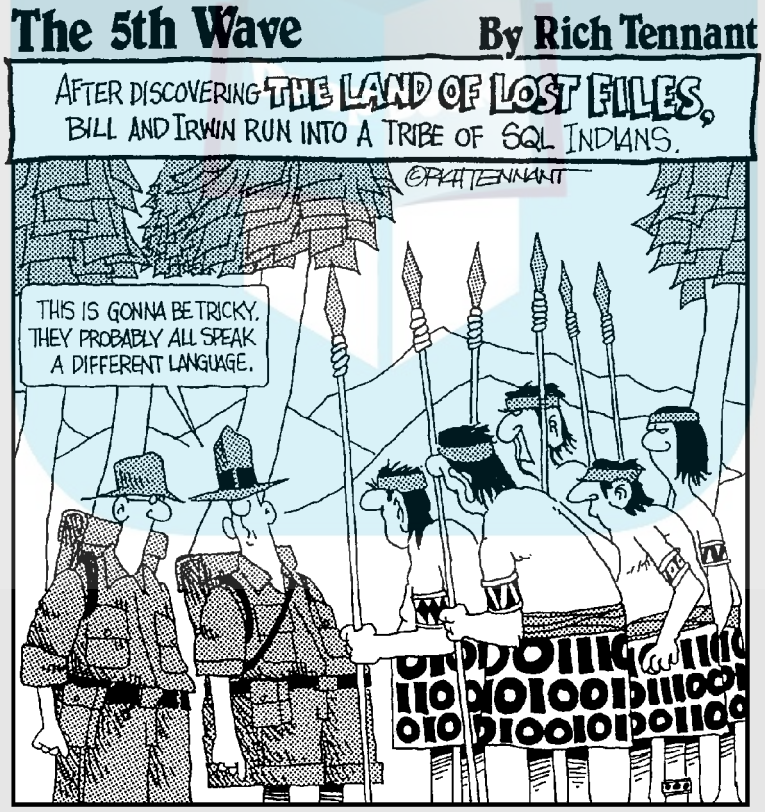
Part V

Reaching Out with VBA



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In this part . . .

Even though the focus of this book is on using VBA to program Microsoft Access, that doesn't mean that VBA works only in Access. VBA is actually a programming language for all the programs in Microsoft Office, including Microsoft Word, Excel, and Outlook. In this part, you'll discover some tools and techniques for using VBA to automate transferring data among those programs — and even programs that aren't part of Microsoft Office at all.

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Chapter 13

Using VBA with Multiple Databases

In This Chapter

- Importing data from external tables and queries
- Linking to external Access tables
- Creating recordsets from external data
- Importing, exporting, and linking to anything

Usually an Access database (an MDB file) contains all the tables, queries, forms, reports, and other objects that make up a single database. However, you will find situations where it's to your advantage to split things into two or more database files. For example, you might want to put some tables for a database into a single MDB file that's located in a shared folder on a network and then put all the other stuff (queries, forms, reports, and code) in a separate database file. You can then distribute the front-end database to multiple users on the network, thus allowing several people to work with the same tables simultaneously from multiple computers.

Splitting a database into two allows you to set up a client-server relationship between the data in the tables and the queries, forms, reports, pages, macros, and modules that manage and access those tables. The computers that can get to the data are the *clients.* The computer that stores and serves the tables to the clients is the *server.* There are many ways to split up data into a client-server relationship. Take a look at one of the most common methods — the Access Database Splitter.

Client-Server Microsoft Access

As you might (or might not) know, you can use Access's built-in Database Splitter to split any existing database into two separate databases (two separate MDB files). The Database Splitter takes you through the steps necessary

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to split the database. In the process, the wizard creates a database that contains only the tables, giving it the same filename as the original database file, appended with `_be`.

For example, say you split a database file named `MOM.mdb` using the Database Splitter. After the database is split, you end up with a file named `MOM_be.mdb`, which contains all of that database's tables. You also still have your original `MOM.mdb` database containing all the original queries, forms, reports, pages, macros, and modules.

However, `MOM.mdb` won't contain any tables. Instead, the database window shows links to external tables. In the database window, each linked table has an arrow to the left of its icon, as in the example shown in Figure 13-1. Pointing to a linked table's icon or name displays the table's true location in a screen tip at the mouse pointer.

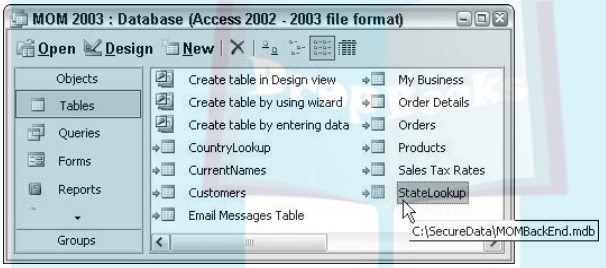

Figure 13-1: Arrows next to table names indicate linked tables.

Splitting the database into two lets you keep the back end separate from the front end. The back end is the database file that contains only the tables. On a network, you can place the back-end MDB file on any shared folder in a network so that all computers in the network can get to the tables.

After you place the back-end database in a shared folder, the next step is just a matter of opening the front-end database to make sure that it can find the linked tables. If you've changed the location of the back-end database since splitting the tables, you can use the Linked Table Manager to reestablish a link with those tables at any time.

Getting back to the `MOM.mdb` and `MOM_be.mdb` example, say you put `MOM_be.mdb` in a shared folder named MOMFolder on a computer named Homie. Then you open the front-end database, `MOM.mdb`, on some computer other than Homie. If the links to the back-end database fail, just choose Tools➪Database Utilities➪Linked Table Manager from the Access menu bar to the new location. In this example, that would be `\\Homie\MOMFolder\MOM_be.mdb`.

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When not to split a database

Splitting a database isn't something to be taken lightly, just for the heck of it. After you split a database file into two, changing or deleting a field in a table becomes a real headache. You have to open the back-end database table and change the field there. Furthermore, Name AutoCorrect won't be able to propagate a field name change through other objects as it normally would. So you might have to manually change the same field name in several objects in the front-end database file.

Splitting a database across multiple computers also slows things down because now there's the extra step of transferring all data to and from tables over the network. To keep life simple and not slow things down while you're trying to create a database, keep your tables, queries, forms, reports, macros, and modules all in one MDB file. Don't even think about splitting things until you've created everything you need — and are sure that everything is working.

If you want to try it, start with a copy of some database (so you still have the original un-split database available to you). Open that database with Access in the usual manner, and then choose Tools➪Database Utilities➪Database Utilities. For more information on the whole shebang, search Access Help go to or `http://search.microsoft.com` and search for the keywords *Database Splitter*, *Linked Table Manager*, and *Name AutoCorrect*.

After you reestablish the links, you can install the front-end database on any computer in the network that has Microsoft Access installed (up to a maximum of five simultaneous users). For example, Figure 13-2 shows how the back-end database is installed on one computer, which acts as the server by serving table data to all who request it. Each of the other computers has a copy of the `MOM.mdb` front-end database installed, so each of those computers has access to exactly the same back-end tables.

Everything I've discussed so far can be done without any VBA at all. The Database Splitter and Linked Table Manager tools are both right on the Tools menu in Microsoft Access. After you establish a valid link between the front-end and back-end databases, everything else is automatic. As far as queries, forms, reports, macros, and modules go, a linked table is no different from a *local table* (a table that's actually in the current database, not just linked).

Here is a downside to the whole business of splitting the tables from the other objects. network traffic. It takes time to get things across a network. The heavier the traffic on the network, the longer it takes.

You might have situations where a certain external table needs to be accessed only occasionally. Perhaps only a snapshot of some data is all that's required. In such cases, you can use VBA to open and close external links on an as-needed basis. For example, you can attach code to a form's `On Load` and `On Unload` events to interact across the network only while that form is open or only at the moment when the data is required.

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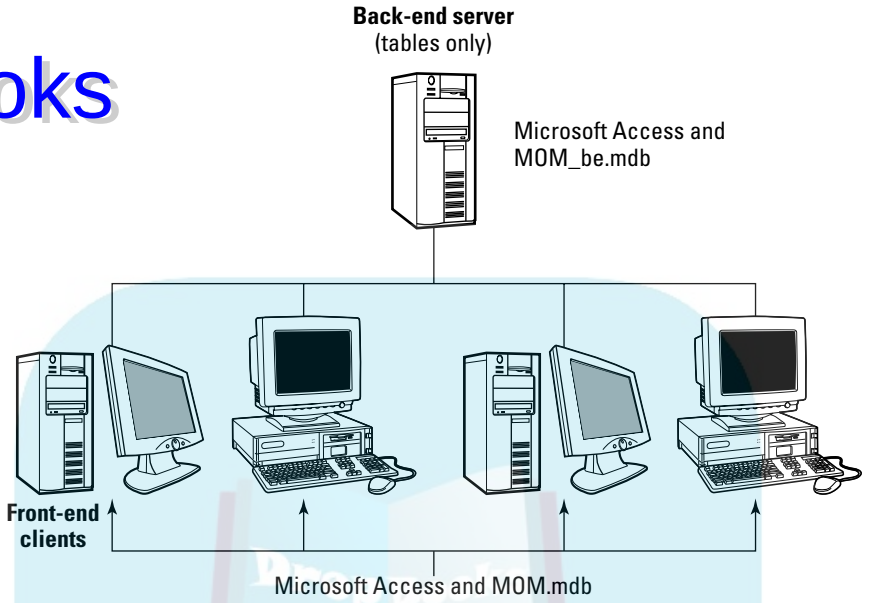

Figure 13-2: Front-end clients and back-end server.

To illustrate the various techniques shown in this chapter, I use an example of a single Access MDB file named `MOMSecure.mdb`. To keep names short, this table is stored in a folder named SecureData on drive `C:`. Thus, the path to the database file is `C:\SecureData\MOMSecure.mdb` from any other Access database. (Most of the code that follows is copy-and-paste stuff. In most code, you'll need to change the path to reflect the actual location of your own external MDB file.)

If `MOMSecure.mdb` were in a shared folder named SecureData on a computer named Max in a local network, the path would be `\\Max\SecureData\MOMSecure.mdb` from any Access database on the LAN.

Changing linked tables back to local tables

To convert a linked table back to a local table, do the following:

1. **Right-click the linked table's icon in the database window and choose Cut.**
2. **Press Ctrl+V or right-click some empty space in the database window and choose Paste.**
3. **In the Paste Table As dialog box that opens, type the original table name (same as the linked table's name), choose Structure and Data (Local Table), and then click OK.**

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To keep things relatively simple, say that `MOMSecure.mdb` contains only two objects: one table and one query. The table's name is `CCSecure`; its structure is shown at the left side of Figure 13-3. The figure also shows some sample data in that table, in Datasheet view.

By the way, the names and credit card numbers shown are entirely fake. Don't bother trying to use them to shop online.

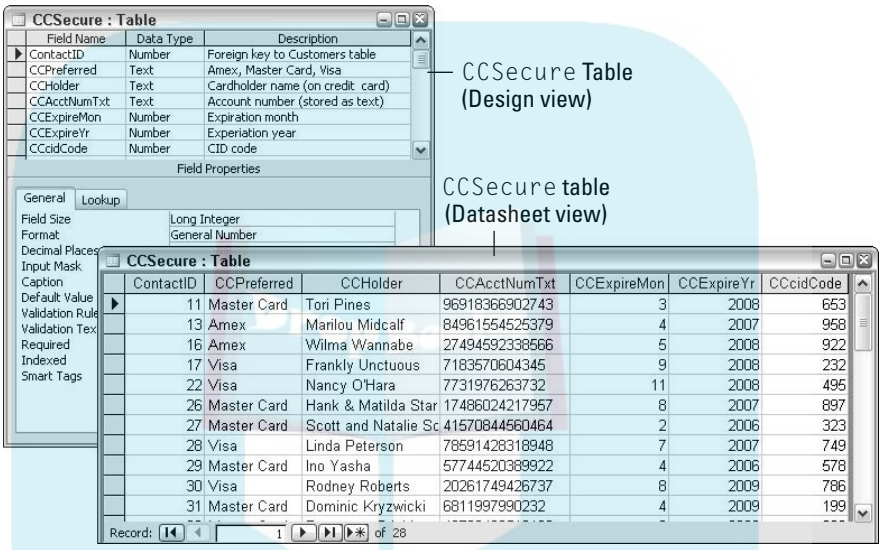

Figure 13-3: `CCSecure` table in Design and Datasheet views.

As you might have guessed already, the *CC* in the field names is short for *credit card.* Here's a quick overview of the purpose of each field in the `CCSecure` table:

- `ContactID`: A `Long Integer` that relates each record to a specific customer in a separate `Customers` table. `ContactID` is the foreign key here in the `CCSecure` table and the primary key in the `Customers` table.
- `CCPreferred`: Contains the name of a preferred credit card, such as Amex, Master Card, or Visa.
- `CCHolder`: Contains the cardholder name as it appears on the card.
- `CCAcctNumTxt`: Stores the card account number as text: for example, `1234567898765432`.
- `CCExpireMon`: The month when the card expires, as an integer (1–12).
- `CCExpireYr`: The year when the card expires, as an integer: for example, 2005, 2006, and so forth.
- `CCcidCode`: The three-digit CID code that appears on the back of the credit card.

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The second object of `MOMSecure` is a query named `CCSecureQry`. For this example, I created a query named `CCSecureQry`. This query displays all records from the `CCSecure` table except the account number and CID fields. In place of the account number is a calculated field named `CCHint`, which is a calculated control based on the expression shown here:

```
CCHint: "xxxx-xxxx-xxxx-"+Right([CCAcctNumTxt],4)
```

Figure 13-4 shows the `CCSecureQry` query both in Design and Datasheet views. I omitted the `CCcidCode` field from the query for no particular reason other than to have an example of leaving fields out of a query. As you can see in the Datasheet view, the `CCHint` field displays `xxx-xxx-xxx-`*1234*, where *1234* is the last four digits of the account number. Thus, the query is hiding some information from the `CCSecure` table.

`CCAcctNumTxt` is a text field, so you use the expression `Right([CCNumTxt],4)` to refer to the last (rightmost) four characters of that field's contents.

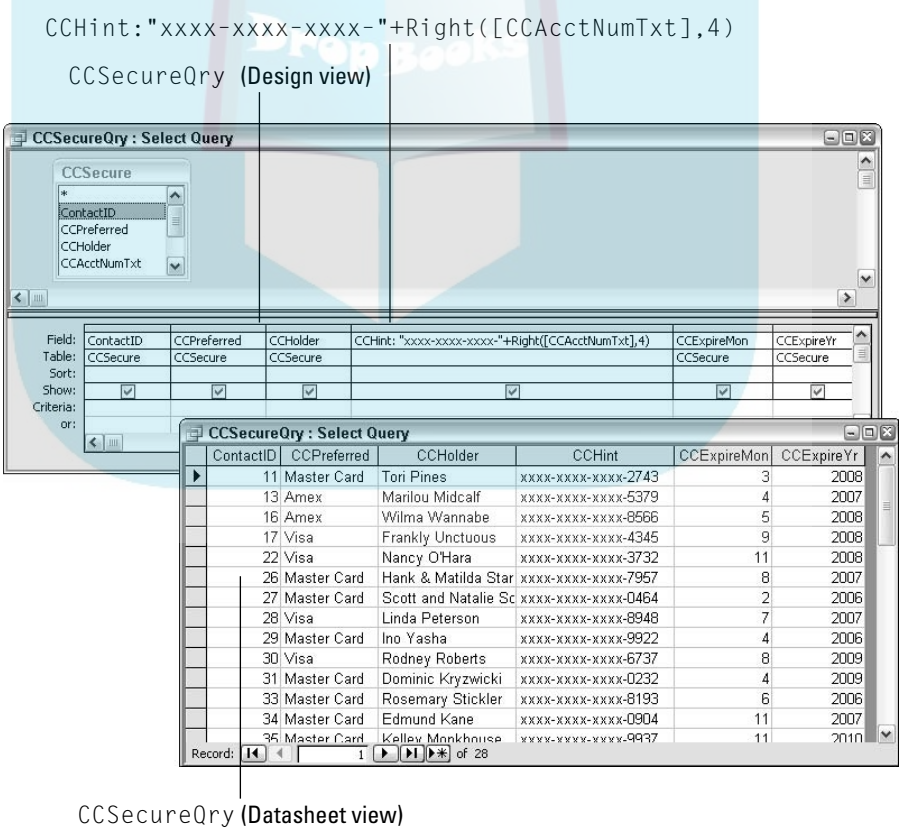

Figure 13-4: CCSecure Qry in C:\Secure Data\MOM Secure.mdb.

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In a sense, you've turned the `MOMSecure.mdb` database into a little black box from which you can zap some credit card info out of a query (or the table, if need be) from any other Access database in the network. I suppose you could call it your *customer credit card information server.* I suppose you can't call it your *secure server* right now because making it secure would require some close encounters of the Network Administration kind, which has nothing to do with Access nor VBA.

So how can any Access database on the network reach into `MOMSecure.mdb` and grab data, even when that database is closed? Here are the three answers to this question, and you can use whichever method seems most appropriate to the occasion:

- **Import (a snapshot):** You can import a snapshot of a table or query, storing it as a table in the current database. The imported table is a local table and won't reflect any changes made to the source table since the snapshot was taken.
- **Link:** You can create a link to any table in any external database. This type of link is identical to that created by the Database Splitter. Changes made to the source table will be reflected in the linked table.
- **Recordset:** You can create an ActiveX Data Objects Database (ADODB) recordset of any table or query from an external database. Recordsets are useful when you need only a brief snapshot of external data, like when using that data for a single VBA procedure only.

Each of the methods has its pros and cons. Which method is most appropriate at any given time depends on the situation. If the situation calls for a quick snapshot of current data, you can import data. If the situation calls for an open link to the table, like when both tables need to be up-to-date with each other, you need either a link or a recordset. Start with the easiest scenario first — the quick-zap grab of a snapshot of current data.

Importing from External Databases

You can import data from any external Access table or query into a table in the current database. There are a couple of advantages to this approach. When you import, you actually create a table, within the current database, that contains an exact clone of the external table or query. Secondly, the imported data are stored in a normal, local Access table. After the table exists in the current database, all other objects in the database that depend on that table work just fine. No special handling is required.

The only disadvantage is that any changes made to the copy of the table in the current database won't carry over to the original table — nor vice versa

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because the local table and external table are no longer connected in any way. So you want to use this approach

- When the external table is one that doesn't change much
- When the current database needs the external table's data only for a short period of time

The `TransferDatabase` method of the `DoCmd` object is the easiest way to import an external table or query with VBA. The general syntax is shown here. Note that when typing your own code, you should type it in as one long line without the continuation characters (_). Or, if you want to break the statement into shorter lines, make sure that you end each of the first two lines with a blank space and an underscore, as shown here:

```
DoCmd.TransferDatabase acImport, "Microsoft Access", _
"pathToExternalDB", acTable, _
"externalTblQry", "localTableName"
```

where

- *pathToExternalDB*: This is the complete path and filename of the database file that contains the table or query.
- *externalTblQry*: This is the name of the table or query in the external database that contains the data you wish to import.
- *localTableName*: This is the name of the table in which the imported data will be stored.

For example, assume that at the moment when the `MOM.mdb` database is open in Access, `C:\SecureData\MOMSecure\MDB` actually does exist. When executed, the following statement creates a local table named `CCSecure`, whose contents are a snapshot of the `CCSecureQry` query's Datasheet view, from the external database at `C:\SecureData\MOMSecure.mdb`:

```
DoCmd.TransferDatabase acImport, "Microsoft Access", _
   "C:\SecureData\MOMSecure.mdb", acTable, _
   "CCSecureQry", "CCSecure"
```

After the preceding code executes, the `MOM.mdb` database window contains a new icon named `CCSecure`. It's a normal table icon — not a link — because there is no link to the `MOMSecure.mdb` file. Opening the table shows a snapshot of the `MOMSecure.mdb` table's `CCSecureQry`, as shown in Figure 13-5.

If the current database already contains a table with the name specified in the *LocalTableName* argument, Access will create a new, separate table — a duplicate — with that name followed by a digit. There are easy ways to avoid that problem, as discussed in the section, "Avoiding Multiple Tables and Links," a little later in this chapter.

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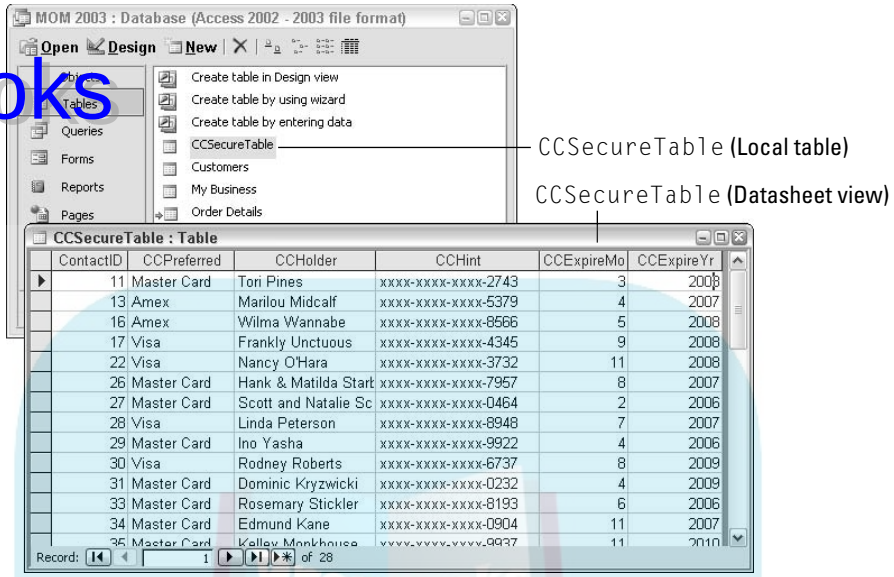

Figure 13-5: Table contains data imported from an external query.

When VBA executes the preceding code, Access actually performs these tasks behind the scenes:

1. Opens the database named `C:\SecureData\MOMSecure.mdb` and then opens the query named `CCSecureQry` in Datasheet view.
2. Creates a new, local table named `CCSecureTable` as an exact clone of `CCSecureQry`.
3. Closes `CCSecureQry` and `C:\MOMSecure.mdb`, breaking the connection between the two databases.

The code for linking to an external table is almost the same as the basic syntax I've shown and my example of importing data from an external database's table or queries.

Linking to External Data through Code

The `TransferDatabase` method of the VBA `DoCmd` object also provides a syntax for linking to an external table (but not a query). Note that the first argument after `TransferDatabase` is `acLink` rather than `acImport`. Other than that, the syntax is basically the same:

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```
DoCmd.TransferDatabase acLink, "Microsoft Access", _
   "pathToExternalDB", acTable, _
   "externalTbl", "localTableName"
```

For example, the `DoCmd.TransferDatabase` (as shown here) sets up a link from the current database to an external table named `CCSecure` in the database file named `C:\SecureData\MOMSecure.mdb`. When the procedure executes, the database window gains a link icon named `CCSecureLinked`. That linked table will contain the current contents of the external table:

```
DoCmd.TransferDatabase acLink, "Microsoft Access", _
   "C:\SecureData\MOMSecure.mdb", acTable, _
   "CCSecure", "CCSecureLinked"
```

After the preceding statement executes, the current database's database window will display a new link icon named `CCSecureLinked`. The arrow in the icon shows that this is a linked table, identical to the kind of linked tables that the Database Splitter creates. Opening the link shows the contents of the external table, as in Figure 13-6.

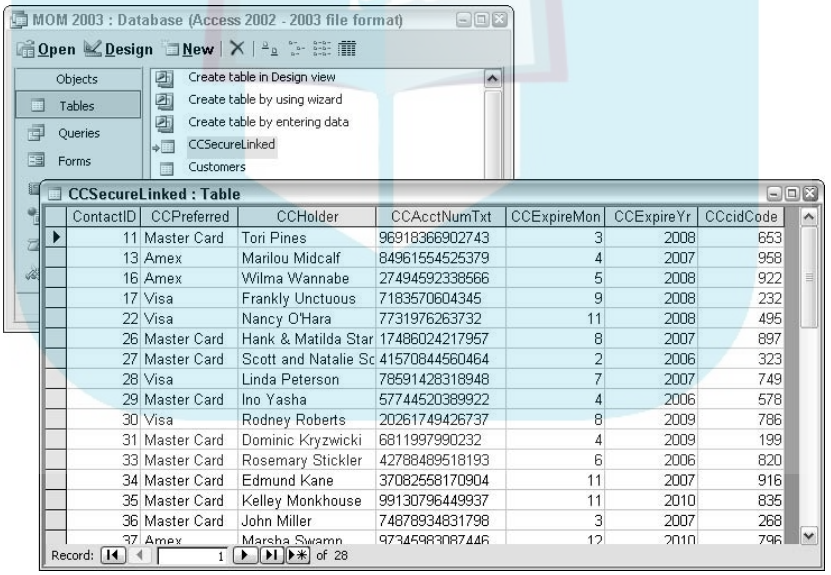

Figure 13-6: Result of linking to `CCSecure` table in `C:\SecureData\MOMSecure.mdb`.

The advantage of the linked table over the imported table is that the linked table shows live data from the external `MOM2003Secure.mdb` file. Therefore, if somebody changes the table data, from any database, those changes are reflected in the linked table. The main disadvantage is that data access slows down because the link requires some network traffic between the actual table and the local link.

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The other disadvantage — at least within the context of this example — is that you can't link to a query. You have to link to a table. So the only choice here is to link to the table, thereby making all the table's fields visible in Datasheet view. (However, a query in the local database that gets its data from the linked table could still hide any information within that table.)

Avoiding Multiple Tables and Links

One of the big tricks to using the `TransferDatabase` method is being aware of how it names the table or link that it creates. It won't overwrite an existing table. If the current database already contains a table or link with the name that you specify in the *`localTableName`* argument, Access creates a new table or link with a number added to the name.

For example, if `CCSecureTable` already exists when you run the code to import its data, Access creates the new table as `CCSecure1`. Run the code again, and you get `CCSecureTable2`, then `CCSecureTable3`, and so forth. The tables (or links) just keep piling up, and this is not good.

You can solve the piling-up problem by writing a general-purpose procedure that always deletes the existing table (if it exists) prior to creating the new table. You can set things up so that you just have to copy and paste the whole thing into any code that needs to import or link to an external table. Look at a couple of examples.

The procedure in Listing 13-1, named `ImportQry`, imports a query from an external database. It ensures that you don't end up with multiple liked tables by first deleting any previously imported copy of the table by the same name.

Listing 13-1: Getting Data from an External Query

```
'Import a table snapshot from an external query.
Public Sub ImportQry(dbPath, extQry, localName As String)
   'Loop through the AllTables collection.
   Dim tbl As AccessObject, thisDB As Object
   Set thisDB = Application.CurrentData

   For Each tbl In thisDB.AllTables
      'If the local table already exists...
      If tbl.Name = localName Then
         'If table is open...
         If tbl.IsLoaded Then
            '...close the table.
            DoCmd.Close acTable, localName, acSaveNo
```

(continued)

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Listing 13-1 *(continued)*

```
            End If
            '...delete the local table.
            DoCmd.DeleteObject acTable, localName
         End If
      Next tbl

      'Local table gone, import the query now.
      DoCmd.TransferDatabase acImport, "Microsoft Access", _
         dbPath, acTable, extQry, localName
      'All done.
End Sub
```

You can just copy and paste the entire procedure above into any standard module in your front-end database. Then, in any code that needs to import query results from an external database, call the procedure with the syntax

```
Call ImportQry("pathToDB","extQry","localName")
```

where

- *pathToDB* is the full path and name to your external database.
- *extQry* is the name of the query in that external database you wish to import.
- *localName* is the name as it will appear in the current database.

For example, the following code imports data from the `CCSecureQry` in `C:\SecureData\MOMSecure.mdb` into a local table named `CCSecureTable`. The whole procedure is bound to the `On Click` event of a hypothetical button named `ImportBttn`:

```
Private Sub ImportBttn_Click()
   Call ImportQry( _
   "C:\SecureData\MOMSecure.mdb", _
   "CCSecureQry", "CCSecure")

End Sub
```

Listing 13-2 shows a similar procedure for linking to external tables — a procedure named `LinkToTable` that can set up a link to any external Access database table. Before doing so, it will delete the existing link, if any, to avoid multiple links to the same table. It's basically the same code as the preceding `ImportQry()` procedure. However, it sets up a link to the external table using `acLink` on the `TransferDatabase` method:

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Listing 13-2: Link to a Table in an External Database

```
Public Sub LinkToTbl(dbPath, extTbl, localName As String)
   'Loop through the AllTables collection.
   Dim tbl As AccessObject, thisDB As Object
   Set thisDB = Application.CurrentData

   For Each tbl In thisDB.AllTables
      'If the local table already exists...
      If tbl.Name = localName Then
         'If table is open...
         If tbl.IsLoaded Then
            '...close the table.
            DoCmd.Close acTable, localName, acSaveNo
         End If
         '...delete the local table.
         DoCmd.DeleteObject acTable, localName
      End If
   Next tbl

   'Local table gone, import the query now.
   DoCmd.TransferDatabase acLink, "Microsoft Access", _
      dbPath, acTable, extTbl, localName

   'All done.
End Sub
```

Once again, you can just copy and paste the entire procedure, as-is, into any standard module in your database. When you want to set up a link to an external table, call the function by using the following syntax:

```
Call LinkToTable("extDB", "extTable", "localName")
```

For example, to link to a table named `CCSecure` in a database named `C:\SecureData\MOMSecure.mdb` — and ensure that you won't re-create the previous link — just call the procedure from your code by using the syntax

```
Call LinkToTable("C:\SecureData\MOMSecure.mdb", _
"CCSecure", "CCSecureLinked")
```

Creating Recordsets from External Tables

You can also use VBA to create an ADODB recordset from any Access table, even one outside the current database. The basic idea is the same as in Chapter 7, where you need to define a connection to the table before creating a recordset. For example, the boilerplate code for defining a recordset from a local table starts out something like this:

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```
Dim cnn1 As ADODB.Connection
Set cnn1 = CurrentProject.Connection
Dim myRecordSet As New ADODB.Recordset
myRecordSet.ActiveConnection = cnn1
<etc...>
```

The only problem in that code is the `CurrentProject.Connection` is a reference to local tables. When the table from which you want to create a recordset exists outside the current database, you need to use a different connection. When the table is in an external Microsoft Access database (MDB) file, use the following syntax to define a local recordset, changing only the arguments shown in italics:

```
'Build a recordset from foreign .mdb database.
Dim CnnStr As String
CnnStr = "Provider=Microsoft.Jet.OLEDB.4.0;"
CnnStr = CnnStr + "User ID=Admin;"
CnnStr = CnnStr + "Data Source=path"

Dim cnn2 As New ADODB.Connection
Dim MyRecordSet As New ADODB.Recordset
MyRecordSet.ActiveConnection = CnnStr
MyRecordSet.Open "Select * FROM [table/query]"
```

where *path* is the full path and filename of the external database file, and *table/query* is the name of a table or query within that table. For example, the following code creates, in the current database, a recordset named `MyRecordSet` that contains all the records from `CCSecureQry` in the external database `C:\SecureData\MOMSecure.mdb`:

```
'Build a recordset from foreign .mdb database.
Dim CnnStr As String
CnnStr = "Provider=Microsoft.Jet.OLEDB.4.0;"
CnnStr = CnnStr + "User ID=Admin;"
CnnStr = CnnStr + "Data Source=C:\SecureData\MOMSecure.mdb"

Dim cnn2 As New ADODB.Connection
Dim MyRecordSet As New ADODB.Recordset
MyRecordSet.ActiveConnection = CnnStr
MyRecordSet.Open "Select * FROM [CCSecureQry]"
```

After this procedure executes, the current database will contain an ADODB recordset named `MyRecordset` that contains the contents of the external `CCSecureQry` query. The recordset will be invisible, as always. You'll need to use VBA code and ADODB recordset syntax to access data in the recordset.

See Chapter 7 for more information on creating and using ADODB recordsets.

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Importing/Exporting/Linking to Anything

As you might know, you export data from Access to a variety of formats. You can do so *interactively* (without code). Here's how.

1. **In the database window, click the table, query, or other object that you want to export.**
2. **Choose File⇨Export from the Access menu bar.**
3. **In the Export dialog box that appears, choose a document type from the Save As Type drop-down list.**
4. **Navigate to a folder, enter a filename for the exported data, and click the Export button.**

Using a macro to write the code

If you want to automate the exportation so that a user can do it with the click of a button, your best bet is to create a macro that uses the `OutputTo` action to export the data to a file. Here's how:

1. **Open the Access database that contains the database to export.**
2. **Click Macros in the database window, and then click the New button.**
3. **Choose OutputTo as the Action argument, and then fill in the Action Arguments as summarized in Table 13-1.**

   Press F1 while the cursor is in any Action Argument for more information on that argument.
4. **Close and save the macro.**

Table 13-1 Action Arguments

Action Argument	*Description*
Object Type	Choose the type of object in your database you wish to export (typically table or query).
Object Name	Choose the name of the object you wish to export.
Output Format	Choose format, such as HTML or .wks (worksheet), from the list of available options.
Output File	Enter the complete path and filename of the file you wish to create from the exported data.

(continued)

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Table 13-1 *(continued)*

Action Argument	*Description*
Auto Start	Choose Yes to have the exported object open automatically, or choose No to leave the exported object closed.
Template File	(Optional) Available only for HTML exports; specifies the name of a template file to use for formatting the HTML output.
Encoding	(Optional) Specifies a character set for the exported table. Leave blank for standard encoding used within the database.

As an example, Figure 13-7 shows the selections needed to export a query named `Customer Lookup Qry` to an HTML page named `FirstTest.htm` in a folder named C:\SecureData on the current computer.

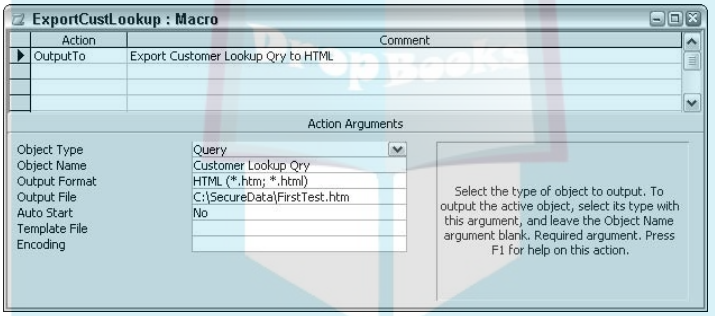

Figure 13-7: Macro to export a query to an HTML file.

For this example, I name the macro `ExportCustLookup`.

To test the macro, click its name in the database window and then click the Run button in the database window's toolbar. If all is well, the data should export without providing any feedback onscreen. To verify that the macro worked, go to the folder in which you placed the exported file and double-click its icon to open it. If the file is right, you're done: You've written the code necessary to export your data.

Because you used a macro to go the export, the code for exporting the data isn't visible like it would be in VBA. However, you can get around that in a couple of ways. You can keep the macro, as-is. Then when you want to export data from some procedure, use the following syntax:

```
DoCmd.RunMacro "macroName"
```

where *`macroName`* is the name of the macro to run. For example, after creating the `ExportCustLookup` macro in a database, you could add the following

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statement to any procedure in the current database when you want code to export the query:

```
DoCmd.RunMacro "[ExportCustLookup]"
```

You can convert any macro to VBA code and then copy and paste the code into any VBA procedure. After you copy the converted code to a procedure, you won't need the macro anymore nor the `DoCmd.RunMacro()` statement. The code will run just like any code that you typed into the procedure yourself. Here's how to convert a macro to VBA:

1. **Click Macros in the database window, and then click the macro that you want to convert.**
2. **Choose Tools➪Macro➪Convert Macros to Visual Basic.**
3. **To convert without adding error-trapping to the exported code, clear (uncheck) the Add Error Handling to Generated Functions check box.**
4. **Click Convert, and then click OK when the conversion is finished.**

To get to your converted code, click Modules in the database window. The converted macro will be in a module named `Converted Macro - yourMacroName` where *yourMacroName* is the name of the macro that you converted. Double-click that module name to see the converted code.

The converted code will be inside a pair of `Function...End Function` statements, as in the example shown in Figure 13-8. There, you see the results of converting the macro shown in Figure 13-7 to VBA. (You can really get a sense here of how a macro is nothing more than VBA code that you create by filling in the blanks in action arguments rather than typing the source code in the VBA editor.)

To use the converted code, copy everything between the `Function...End Function` statements: that is, excluding the `Function` and `End Function` statements. Then paste that converted code into any class module or standard module, where you would otherwise have used `DoCmd.RunMacro()` to execute the macro.

Quick and easy import/export

The truth be told, the bit about creating a macro to import, export, or link to external data holds true for all kinds of transfers between Access and other files. The easiest way to solve any import/export/link problem is to create a macro to do the job. I've barely scratched the surface of all that's possible here.

In a macro, choose any action listed here to create a macro to do some sort of import, export, or link:

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- `CopyObject`: Copy tables, queries, forms, reports, macros, and modules to the same or a different database (MDB file).
- `OutputTo`: Output an Access table, query, form, report, module, data access page) to an Excel 98 (`*.xls`), MS-DOS text (`*.txt`), rich-text (`*.rtf`), HTML (`*.html`), Active Server Pages (`*.asp`), or Internet Information Server (IIS) formats (`*.htx`, `*.idv` format).
- `SendObject`: Send Access an Access table, query, form, report, module, or data access page via any e-mail server that supports Microsoft Mail Applications Programming Interface (MAPI).
- `TransferDatabase`: Import, link, or export data between two databases. Supports Access, dBase, Paradox, Windows SharePoint Services (WSS), and Open Database Connectivity (ODBC) formats.
- `TransferSpreadsheet`: Import, link, or export data between the current Microsoft Access database (MDB) or Access project (ADP) and a spreadsheet file. Import, export, or link to any Excel worksheet (`*.xls`). Import or export with any Lotus 1-2-3 worksheet (`.wks`).
- `TransferText`: Import, link, or export a Microsoft Access database (MDB) or Access project (ADP) object with a text, HTML, or Word for Windows merge file.

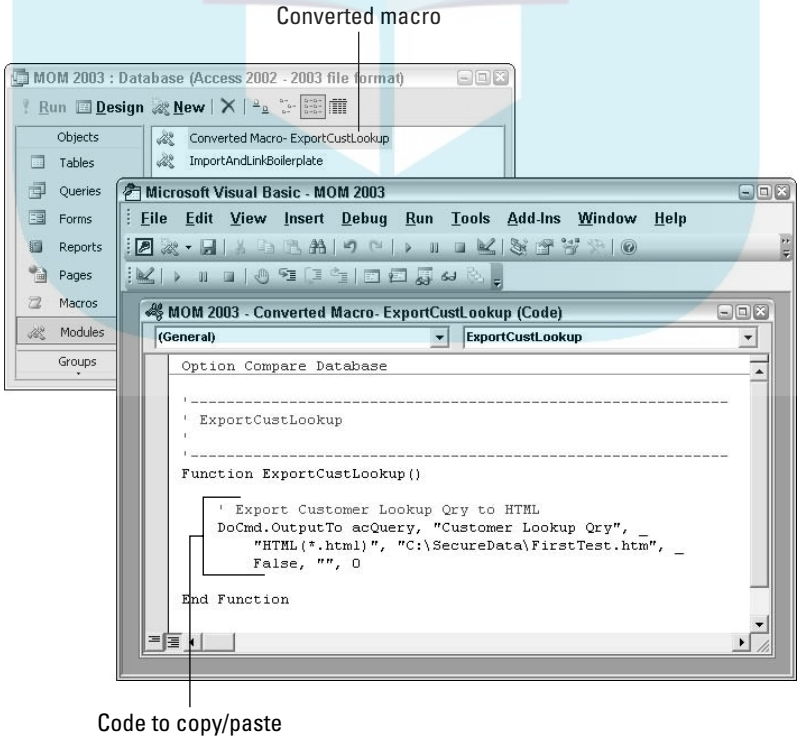

Figure 13-8: Macro converted to VBA code.

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After you choose an action, you can then choose options from the Action Arguments. The Help text to the right of the arguments describes the current argument. You can press F1 for more information on using the argument.

Create your macro, test it out, and make sure that it works. If you just want to use the macro's VBA code, convert the macro to VBA, as described earlier in this chapter. Then copy all the code between the `Function` and `End Function` statements. It's a whole lot easier than trying to write the code from scratch!

The macro actions for importing, exporting, and linking correspond directly to various methods of the `DoCmd` object in VBA. If you're ever in the VBA editor and need help with a `DoCmd` statement, click `DoCmd` in the Members column of the Object browser, as in Figure 13-9. Then click any method name in the right column and click the Object Browser's Help button.

In Chapter 14, you can read about yet another way to reach outside Access to external programs: *Automation,* which works with all the major programs in Microsoft Office.

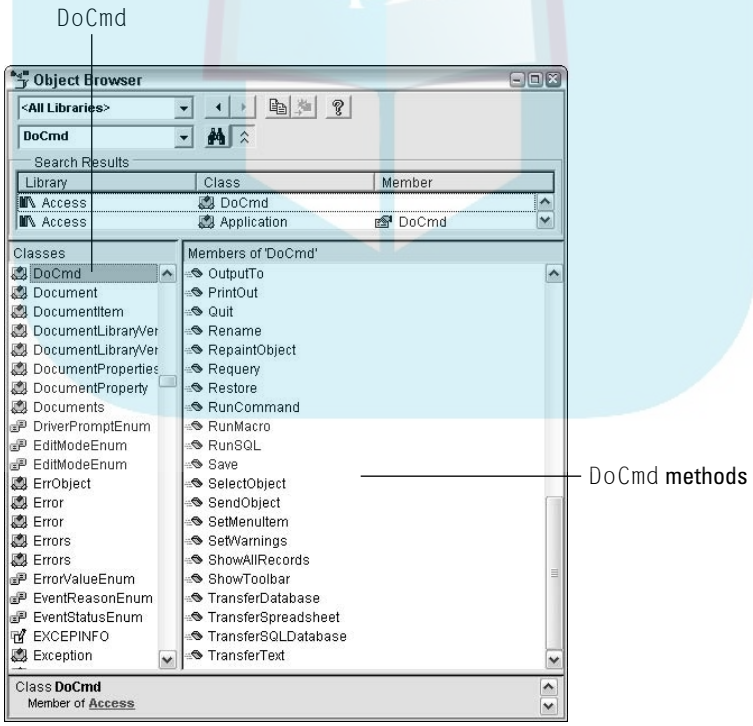

Figure 13-9: DoCmd methods in the Object Browser.

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Chapter 14

Integrating with Other Office Applications

In This Chapter

- Understanding Automation objects
- Sending e-mail via Microsoft Outlook
- Sending commands to Microsoft Word
- Interacting with Microsoft Excel

VBA isn't just a programming language for Microsoft Access. VBA is a programming language for all the Microsoft Office application programs that support Automation. *Automation* (always with a capital A) refers to the ability of a program to expose itself to VBA so that VBA can control it behind the scenes, so to speak.

All the major applications in Microsoft Office, including Microsoft Access, Microsoft Excel, Microsoft Outlook, Microsoft PowerPoint, and Microsoft Word support Automation. You can write code to control any one of them. You can also write code to transfer information among programs. For example, you can automate pulling data from an Excel worksheet or sending data from an Access table to a Word document.

Accessing the Object Library

In order for VBA to manipulate a program — or a document within a program — VBA first needs to have access to that program's object library. You might envision VBA as sort of a steering wheel that can control any program to which it has access (through an object library), as in Figure 14-1.

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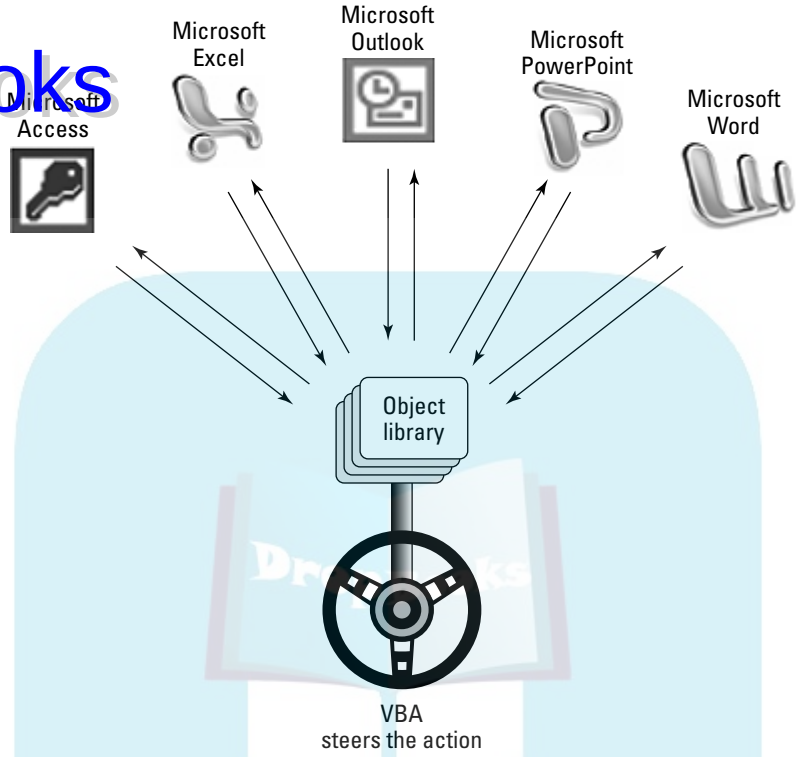

Figure 14-1: VBA can control any program through that program's object library.

To write code for an Office application program, you first need to set a reference to that program's object library. To do so, starting from Microsoft Access, follow these steps:

1. **In Access, open the database that contains objects to share with other programs.**
2. **Choose Tools➪Reference from the VBA editor menu bar.**
3. **From the list of available references, choose the libraries for the programs you want to program.**

For example, in Figure 14-2, I add references to Excel (Microsoft Excel 11.0 Object Library) and Word (Microsoft Word 11.0 Object Library).

Office XP object libraries are version 10.0, and Office 2003 libraries are 11.0. Don't worry about that, though. They work the same as far as this book is concerned.

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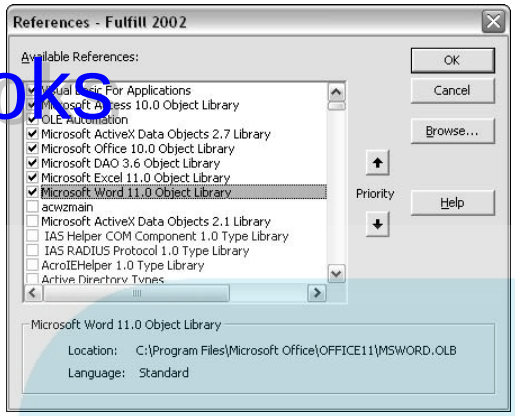

Figure 14-2: Choose object libraries in the References dialog box.

Exploring a program's object model

After you set a reference to a program's object model, you can explore its exposed objects, properties, and methods through the Object Browser. In the VBA editor, just press F2 or choose View➪Object Browser. To limit the display to a given program's objects, choose that program's name from the Project/Library drop-down list. For example, in Figure 14-3, I select Excel from the Project/Library drop-down list. The classes and members in the columns beneath this list refer to Microsoft Excel and any data that might be in the currently open Excel worksheet.

In the Object Browser, *classes* mean objects, collections, and such, whereas *members* mean properties, methods, and events of (whatever is currently highlighted in the Collections pane).

For more goods on the Object Browser, see Chapter 1.

Each Office application exposes a lot of objects to VBA. Even if you limit the Object Browser to show just one program's model, you still end up with a zillion names of things. There isn't enough room in this book to define all those things. You just have to learn how to get the information you need (whatever that might be) when you need it. In the Object Browser, that generally involves clicking the name you need help with and then clicking the ? (Help) button.

Meet the Application object

Different application programs expose different object models to VBA, but all programs have in common an `Application` object (with a capital A). The program's `Application` object exposes all that program's collections and objects to VBA.

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If a document is open in the program, the document's objects are also exposed to VBA. For example, when VBA opens an Excel worksheet, Excel exposes its own capabilities to VBA through its `Application` object. Every object in the worksheet is also exposed. Basically, VBA can do anything in the worksheet that a person actually sitting at the worksheet could do from Excel's menus.

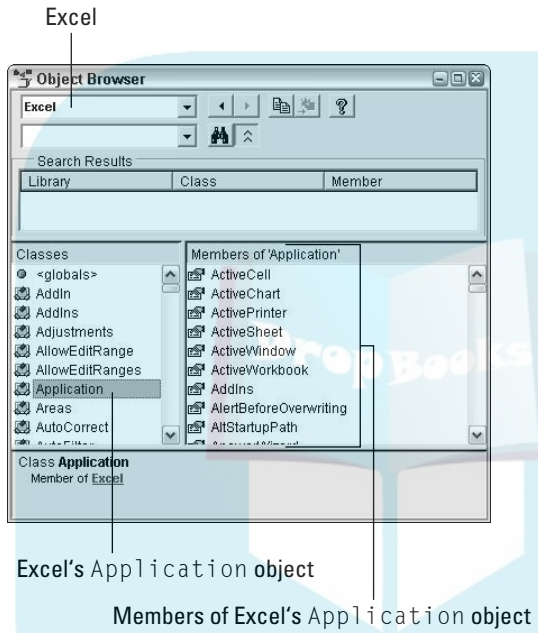

Figure 14-3: Viewing classes and members of Excel's object library.

What if I don't have Word/Excel/Outlook?

Automation between Microsoft Office programs works only with the programs currently installed on your computer. If you don't have a given program (like Microsoft Outlook) installed, you can't load its object library or control it through VBA.

Things can get confusing when you copy a database (an MDB file) that contains VBA code to a different computer. Any code that refers to Word, Excel, Outlook, or PowerPoint will fail if the current computer doesn't have those programs installed. In other words, VBA can't create those programs if they're missing. VBA can use those programs only if they already exist on the current computer.

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Connecting to other programs

After you set a reference to an external program's object library, you can create instances that you program in VBA. An *instance* is basically the same idea as an open program window. For example, when you start Microsoft Internet Explorer on your computer, you're actually creating an instance of Internet Explorer. If you right-click a link and choose Open in New Window, a new, separate Internet Explorer window opens to show the new page. Now you have two instances of Internet Explorer open, each showing a different Web page.

Before you can create an instance of a program, you have to declare an object variable that will become the name used by VBA to refer to the program. The object variable name can be any name you like. Just try to think of a short, simple name that's meaningful. The syntax for declaring an object variable that refers to an external open program is

```
Dim objectVariable As New program.Application
```

In the syntax, *objectVariable* is the object variable name, and *program* is a reference to one of the Office application programs: Word, Excel, Outlook, or PowerPoint. The `.Application` part refers to the program's `Application` object of that program. The `New` keyword is optional but recommended because it ensures that the object will create a new instance of the program. Examples of declaring object variables for each of the Office programs follow.

```
Dim XL As New Excel.Application
Dim Wrd As New Word.Application
Dim Olk As New Outlook.Application
Dim Ppt As New PowerPoint.Application
```

You must set a reference to a program before writing a `Dim` statement to declare an instance of the program.

After you declare an object variable to refer to an open instance of a program, you can then open that program (and any document) so that your VBA code has access to all the program's objects. The syntax for opening a program is

```
Set objectVariable As CreateObject("program.Application")
```

where *objectVariable* is the same as the name you specified in the `Dim` statement, and *program* is the name of the application program: Excel, Word, PowerPoint, or Outlook. Referring to the earlier `Dim` statements, the `Set` statements that you use for each defined object variable are the following:

```
Set XL = CreateObject("Excel.Application")
Set Wrd = CreateObject("Word.Application")
Set Olk = CreateObject("Outlook.Application")
Set Ppt = CreateObject("PowerPoint.Application")
```

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I use short names for my object variables here: `XL` for Excel, `Wrd` for Word, `Olk` for Outlook, and `Ppt` for PowerPoint. You can use any names you wish. I kept mine short just to save space here.

Anyway, that's the basic procedure for making the connection to an external program. To review and summarize, the basic procedure is

1. **Set a reference to the program's object library in the Reference dialog box.**
2. **In your code, use a `Dim` statement to a name that you'll use in code to refer to the program.**
3. **After the `Dim` statement, use a `Set` statement with `CreateObject()` to open an instance of the program.**

You can see examples in the sections that follow where I share data between Microsoft Access, Outlook, Word, and Excel.

Sending E-mail via Outlook

Suppose you want to be able to send e-mail messages to people listed in a table named `Customers` in an Access database. You are absolutely certain that you can send and receive e-mail with Microsoft Outlook. (***Important:*** None of the code described here will work with Outlook Express or a Web browser.) For this example, say you want to create a standard form letter-type e-mail message to whatever customer a user chooses from a drop-down menu, as in Figure 14-4. There, the controls named `MsgAddress` and `MsgSubject` are text, and `MsgBody` is a memo field.

Microsoft Outlook has built-in security to prevent you from sending huge mass-mailings from Access. If you're thinking of using it to flood the Internet with some junk e-mail message, it won't work.

Figure 14-4: Controls on a sample e-mail form.

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When the user clicks the Send button in Figure 14-4, you want VBA to create and send an e-mail message. Because you'll be calling on Outlook to do the job, the first step in the VBA editor is to choose Tools➪References from the menu bar and set a reference to the Microsoft Outlook object library.

To write the procedure to send the message, create a procedure that's attached to the Send button. In my example, I name that button `SendMailBttn`. All the code for the procedure is shown in Listing 14-1.

Listing 14-1: Procedure Attached to Send Button

```
Private Sub SendMailBttn_Click()

   'Open an instance of Microsoft Outlook, name it Olk.
   Dim Olk As Outlook.Application
   Set Olk = CreateObject("Outlook.Application")

   'Create a new, empty Outlook e-mail message.
   Dim OlkMsg As Outlook.MailItem
   Set OlkMsg = Olk.CreateItem(olMailItem)

   'Put data from form into the new mail message.
   With OlkMsg
      'Make MsgAddress the "To" address of message.
      Dim OlkRecip As Outlook.Recipient
      Set OlkRecip = .Recipients.Add(Me![MsgAddress])
      OlkRecip.Type = olTo
      .Subject = Me![MsgSubject]
      .Body = Me![MsgBody]
      'Send the finished message.
      .Send
   End With

   'Clean up object variables, then done.
   Set Olk = Nothing
   Set OlkMsg = Nothing
   Set OlkRecip = Nothing
End Sub
```

The procedure looks like a lot of code. Like all procedures, though, it's just a series of small, simple steps. The procedure reaches into Outlook and creates a new, empty e-mail message. The code then fills in that new message with data from the `MsgAddress`, `MsgSubject`, and `MsgBody` controls on the form and sends it — and that's the end of it. Take a look at the code one chunk at a time.

The first two statements under the first comment declare an object variable named `Olk` and set it to an open instance of Microsoft Outlook:

```
'Open an instance of Microsoft Outlook, name it Olk.
Dim Olk As Outlook.Application
Set Olk = CreateObject("Outlook.Application")
```

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The Application object for Outlook lets you declare a create object variable of the type Outlook.MailItem, to which you can then assign a new, blank e-mail message. In the following code, I create a new, blank e-mail message named OlkMsg. (The name OlkMsg is one I just made up. The Olk. in Olk.CreateItem(... is a reference to the open Outlook program, and olMailItem is a constant from the Outlook object library.)

```
    'Create a new, empty Outlook e-mail message.
    Dim OlkMsg As Outlook.MailItem
    Set OlkMsg = Olk.CreateItem(olMailItem)
```

The With...End With block of code sets properties for the newly created e-mail message, OlkMsg.

```
With OlkMsg
...
End With
```

Within the With...End With block of code, the first three lines provide the recipient's e-mail address. The first line, as shown here, declares a new object variable named OlkRecip as an Outlook.Recipient object. (This is a general object for e-mail addresses and can be a To, a CC, or a BCC (blind carbon copy) address field. The second line sets the OlkRecp value to whatever e-mail address is on the MsgAddress control on the form. The last line, OlkRecip.Type,=olTo, turns the recipient address into the To address (where olTo is a constant from the Outlook object library):

```
'Make MsgAddress the "To" address of message.
Dim OlkRecip As Outlook.Recipient
Set OlkRecip = .Recipients.Add(Me![MsgAddress])
OlkRecip.Type = olTo
```

The next two lines copy the contents of the form's MsgSubject and MsgBody controls into the Subject line and body of the e-mail message:

```
.Subject = Me![MsgSubject]
.Body = Me![MsgBody]
```

The last line within the With...End With block sends the message, using the syntax OlkMsg.Send:

```
    'Send the finished message.
    .Send
End With
```

Note that all those properties are being applied to the new e-mail message named OlkMsg. The full syntax would be OlkMsg.Subject=..., OlkMsgBody=, and OlkMsg.Send. But here, you can omit the OlkMsg part of the name

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because the `With OlkMsg` statement means *All properties from here to `End With` refer to the new e-mail message named `OlkMsg`.*

After the message is sent, the job is done. Although not absolutely necessary, I did a little housekeeping at the end of this procedure; by setting the object variable names, I created the `Nothing`. Doing so breaks the link between the name and object and reclaims any memory that those things were using:

```
    'Clean up object variables, then done.
    Set Olk = Nothing
    Set OlkMsg = Nothing
    Set OlkRecip = Nothing

End Sub
```

When you actually run the procedure, you'll see why the Access/Outlook combination really isn't appropriate for any mass mailing. When you first run the procedure, you see a security warning, as at the top of Figure 14-5. You need to grant permission (for a maximum of ten minutes). Then the real torture sets in as it makes you wait a few seconds and then answer Yes before each sent message. If you were trying to send out hundreds or thousands of messages, you'd be clicking Yes over and over again for a long time.

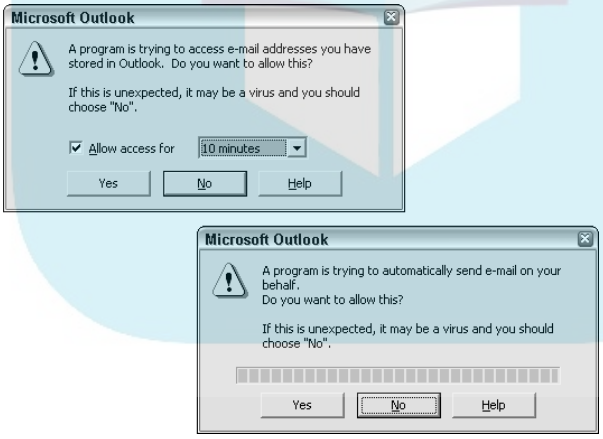

Figure 14-5: Outlook security prevents mass mailings.

Like all object libraries, Outlook's library is quite large and not something that I can discuss in detail here. It would take more pages than there are in this entire book to even list and briefly define each object, property, method, and event in Outlook's object library. After you set a reference to Microsoft Outlook in the VBA editor References dialog box, you can get information from the Object Browser. Everything described in this example comes from Outlook's `Application` object (see Figure 14-6).

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The Microsoft Web site is another good resource for getting more information on automating activity between Access and Outlook. To see what's available, go to `http://search.microsoft.com` and search for *Access Outlook Automation*.

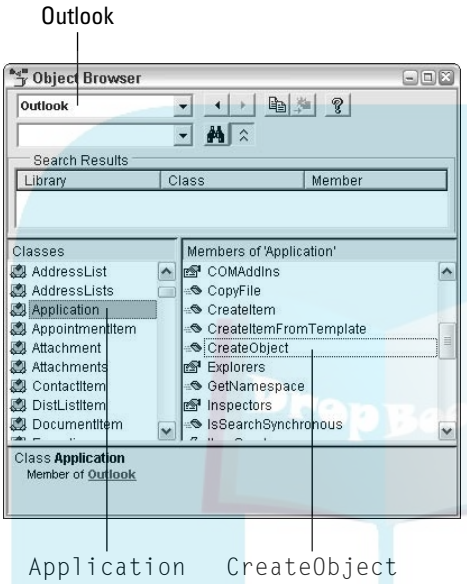

Figure 14-6: Outlook's `Application` object selected in the Object Browser.

Any time you're searching Microsoft's Web site for information on programming interactions between Office programs, include both program names and the word *Automation* in your search.

Sending Data to Microsoft Word

There are plenty of ways to print Access data without getting into VBA. The usual method is to just create a report from the Access database window. You can also use the Microsoft Word Mail Merge Wizard to print form letters, envelopes, labels, and catalogs from any Access table or query. There's no VBA involved in any of that. Just learn to use Word's Mail Merge feature, and you're on your way.

Yet a third approach would be to create a general Word template that contains *bookmarks* (placeholders) for data to be filled in later. Then, use VBA in Access to replace the bookmarks with data from an Access table. This is particularly handy when you want to be able to click a button on a form in Access to print one Microsoft Word form letter.

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Creating the Word template

The first step to merging data from Access into a Word document is to create a Word document template (DOT file). Start with any blank Word document and type your form letter (or whatever you wish) as you normally would in Word. You can use any and all Word features — fonts, pictures, tables, WordArt, whatever.

Wherever you want VBA to insert data from an Access table, create a Word bookmark. A *bookmark* (in Word) is just a placeholder. Bookmarks are usually hidden, so before you add any bookmarks to the document, choose Tools➪Options from the Word menu bar. In Word's Options dialog box that opens, click the View tab, select Bookmarks, and then click OK.

You can insert bookmarks however you wish. Here's how I usually do it:

1. **Move the cursor to where you want VBA to insert data from Access.**
2. **Type a short, simple name for the bookmark.**

   The name cannot contain spaces nor punctuation, and it *must* start with a letter.
3. **Select (double-click) the name you just typed and then press Ctrl+C to copy it.**
4. **Choose Insert➪Bookmark from the Word menu bar.**
5. **Press Ctrl+V to paste the typed name as the bookmark name.**
6. **Click the Add button.**

You'll need to go through those steps for each item of data that you want VBA to insert later. In the example shown in Figure 14-7, I add three bookmarks to the document. Note that the square brackets around each bookmark's name are visible because the Show Bookmarks option is on. I didn't type any of those square brackets.

The bookmark names in the sample document template get data from Access and VBA as follows:

- `TodaysDate`: VBA will replace this bookmark with the current date.
- `AddressLines`: VBA will replace this line with as many lines as necessary to show the recipient's address.
- `Salutation`: VBA will replace this with the customer's first name or just `Sirs` if the first name is `Null` (empty) in the record being printed.

When you finish typing your document and all your bookmarks are in place, follow these steps to save the document as a Word template:

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1. **Choose File➪Save As from Word's menu bar.**
2. **From the Save As Type option at the bottom of the Save As dialog box, choose Document Template (*.dot).**
3. **Use the Save In drop-down list to navigate to the folder in which you want to store the document template.**

   Your best bet would be to put it in the same folder as your database MDB file, but you can use any folder you wish — provided that you know the full path to the document. For example, if you put the Word template in your Shared Documents folder, the path to that document is `C:\Documents and Settings\All Users\Documents`.
4. **Name the document (but don't change the `.dot` extension) and click the Save button.**

   I name my document template `WordFormLetter.dot`, but you can name yours however you wish.
5. **Close Microsoft Word.**

So that takes care of the Word document. The rest of the action takes place in Access and VBA.

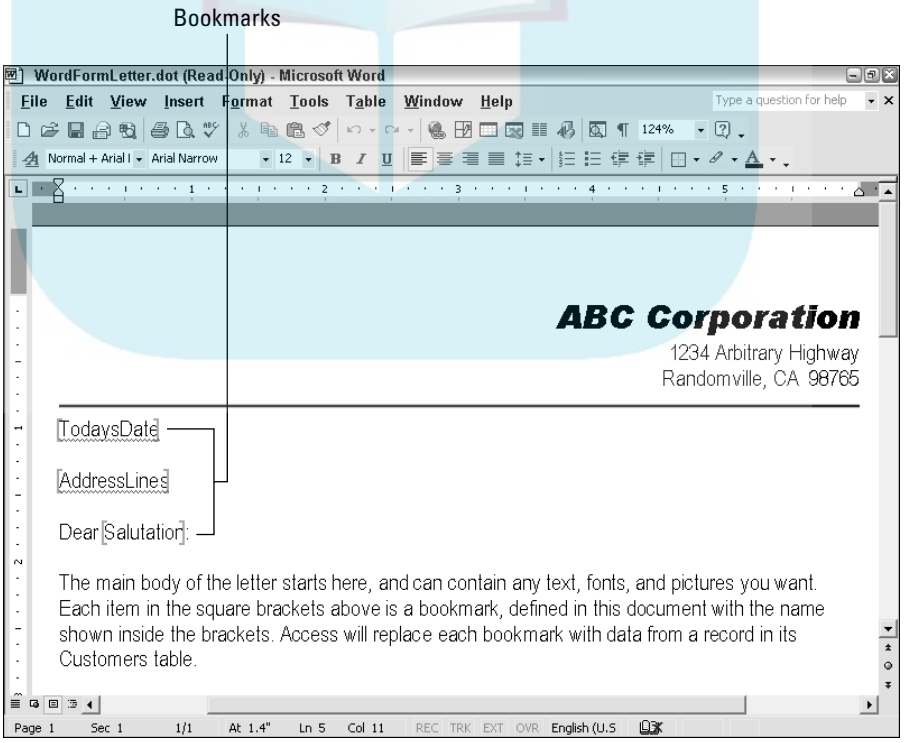

Figure 14-7: Word document template with bookmarks to later accept Access data.

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Creating the Access form

For this example, I create a simple form that's bound to a table named `Customers`, with the usual name and address fields that you'd expect to find in such a table. Figure 14-8 shows a sample form in Form view. The controls that are relevant to the form letter start at the one containing the name *Tori*. Starting at that field, and reading down and to the right, the names of the controls are:

```
FirstName
LastName
Company
Address1
Address2
City
State
ZIP
```

In the VBA code to follow, you'll see them referred to with square brackets — `[FirstName]`, `[LastName]`, `[Company]`, and so forth. The e-mail address control, near the bottom, isn't really relevant to the topic at hand. The drop-down list near the top of the control provides the user with a means of choosing a customer. The Merge to Word Letter button is named `MergeBttn`.

Figure 14-8: Create a form to display one customer's name and address at a time.

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To use the form, a person chooses a name from the Choose a Customer combo box and then clicks the Merge to Word Letter button. That button executes VBA code to open the document template, replaces each bookmark with data from the current record in the form, prints the document, and then closes Word.

Writing the merge code

For this example, I place the code in the form shown in Figure 14-8 by attaching it to the `MergeBttn` control's `On Click` event. The VBA code is shown in its entirety in Listing 14-2.

Listing 14-2: Merge Code

```
Private Sub MergeBttn_Click()

   'Declare variables for storing strings (text).
   Dim AddyLineVar, SalutationVar As String

   'Start building AddyLineVar, by dealing with blank
   'LastName and Company fields (allowed in this table).
   If IsNull([LastName]) Then
      AddyLineVar = [Company]
      'Just set SalutationVar to generic "Sirs".
      SalutationVar = "Sirs"
   Else
      AddyLineVar = [FirstName] + " " + [LastName]
      'If the Company isn't blank, tack that on after name.
      If Not IsNull([Company]) Then
         AddyLineVar = AddyLineVar + vbCrLf + [Company]
      End If
      'Salutation will be customer's first name.
      SalutationVar = [FirstName]
   End If

   'Add line break and Address1
   AddyLineVar = AddyLineVar + vbCrLf + [Address1]

   'If Address2 isn't null, add line break and Address2
   If Not IsNull([Address2]) Then
      AddyLineVar = AddyLineVar + vbCrLf + [Address2]
   End If

   'Tack on line break then City, State Zip.
   AddyLineVar = AddyLineVar + vbCrLf + [City] + ", "
   AddyLineVar = AddyLineVar + [State] + "  " + [ZIP]

   'Declare an instance of Microsoft Word.
   Dim Wrd As New Word.Application
```

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```
    Set Wrd = CreateObject("Word.Application")

    'Specify the path and name to the Word document.
    Dim MergeDoc As String
     MergeDoc = Application.CurrentProject.Path
     MergeDoc = MergeDoc + "\WordFormLetter.dot"

    'Open the document template, make it visible.
    Wrd.Documents.Add MergeDoc
    Wrd.Visible = True

    'Replace each bookmark with current data.
    With Wrd.ActiveDocument.Bookmarks
       .Item("TodaysDate").Range.Text = Date
       .Item("AddressLines").Range.Text = AddyLineVar
       .Item("Salutation").Range.Text = SalutationVar
    End With

    'Letter is ready to print, so print it.
    'Wrd.ActiveDocument.PrintOut

    'All done. Close up (no need to save document)
    Wrd.ActiveDocument.Close wdDoNotSaveChanges
    Wrd.Quit

End Sub
```

Like all procedures, this one is just a series of small steps carried out in a specific order to achieve some goal. The first line tells you that this procedure will execute any time a user clicks the `MergeBttn` button.

```
Private Sub MergeBttn_Click()
```

The next two lines declare two string variables named `AddyLineVar` and `SalutationVar`. Each of those variables will become a string of text to be substituted into the document template in place of the `AddressLines` and `Salutation` bookmarks:

```
'Declare variables for storing strings (text).
Dim AddyLineVar, SalutationVar As String
```

In the `Customers` table I use for this example, the `Address1`, `City`, `State`, and `ZIP` code fields are required, but the user can leave the `FirstName`, `Company`, and `Address2` fields empty (`Null`). The code that follows builds the variable `AddyLineVar` as needed for whatever information is available in the current record. The first big `If...End If` block, shown next, starts out by saying, *If the `LastName` field for this record is empty, make the first line of the `AddyLineVar` the company name and make `SalutationVar` into the general title, `Sirs:`.*

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```
'Start building AddyLineVar, by dealing with blank
'LastName and Company fields (allowed in this table).
If IsNull([LastName]) Then
   AddyLineVar = [Company]
   'Just set SalutationVar to generic "Sirs".
   SalutationVar = "Sirs"
```

If the `LastName` field for this record is not null, the following code adds the customer's first and last names to `AddyLineVar`. Note that `vbCrLf` is the Access VBA constant for a carriage return/linefeed. Each `vbCrLf` in `AddyLineVar` translates to the end of the line in the Word document. Note, too, that `SalutationVar` gets its value from the `FirstName` field in the following code:

```
Else
   AddyLineVar = [FirstName] + " " + [LastName]

   'If the Company isn't blank, tack that on after name.
   If Not IsNull([Company]) Then
      AddyLineVar = AddyLineVar + vbCrLf + [Company]
   End If

   'Salutation will be customer's first name.
   SalutationVar = [FirstName]
End If
```

Because `Address1` is a required field, you can assume that it is not null. The following code adds a `vbCrLf` and the contents of the `Address1` field to `AddyLineVar`:

```
'Add CRLF and Address1
AddyLineVar = AddyLineVar + vbCrLf + [Address1]
```

The next `If...End If` block adds a line break and the contents of the `Address2` field to `AddyLineVar` but only if the `Address2` field isn't empty:

```
'If Address2 isn't null, add CRLF and Address2
If Not IsNull([Address2]) Then
   AddyLineVar = AddyLineVar + vbCrLf + [Address2]
End If
```

Because the `City`, `State`, and `ZIP` fields are required in the `Customers` table, the next lines of code just add another `vbCrLf` to `AddyLineVar`, followed by the `City`, a comma and blank space (`, `), the `State`, two blank spaces, and then the `ZIP`:

```
'Tack on line break then City, State Zip.
AddyLineVar = AddyLineVar + vbCrLf + [City] + ", "
AddyLineVar = AddyLineVar + [State] + "  " + [ZIP]
```

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At this point in the code, the `AddyLineVar` and `SalutationVar` variables both contain the data to be plugged into the form letter. Now you can start writing the code to open Word and replace its bookmarks with some actual data. First, use the standard syntax described earlier in this chapter to declare and open an instance of Microsoft Word:

The VBA editor won't accept the statements that follow if you haven't already selected the Microsoft Word Object Library in your References dialog box.

```
'Declare an instance of Microsoft Word.
Dim Wrd As New Word.Application
Set Wrd = CreateObject("Word.Application")
```

From this point in the code, the object variable named `Wrd` refers to an open instance of Microsoft Word (and its entire `Application` object, which exposes all of Microsoft Word to VBA.)

The next step is to open the document template that contains the bookmarks and text. The syntax for opening a Word document from Access VBA is *`objVar`*`.Documents.Add` *`path`*. The *`objVar`* must match the object variable used in the `Dim` and `Set` statements (`Wrd` in this example).

The path must be the complete path to the Word document. In my example, I place the Word document in the same folder as the database MDB file (which makes it easy to find). In Access, you can use `Application.CurrentProject.Path` to get the path to the currently open database. I name my Word document `WordFormLetter.dot`. The following statements create a string variable named `MergeDoc` that contains the full path and filename of that Word document template:

```
'Specify the path and name to the Word document.
Dim MergeDoc As String
MergeDoc = Application.CurrentProject.Path
MergeDoc = MergeDoc + "\WordFormLetter.dot"
```

If `WordFormLetter.dot` were in some other folder, I couldn't use `Application.CurrentProject.Path` to get its path. I'd have to specify the path literally in the code. For example, in Windows XP, if your user account name is Bobo, and your form letter is named `MyFormLetter.dot` and is stored in your My Documents folder, the following statement will work just fine provided that you type it into the Code window as one long line.

```
Wrd.Documents.Add "C:\Documents and Settings\Bobo\My Documents\MyFormLetter.dot"
```

Normally, when VBA opens an instance of Word, the program window is invisible, and all activity takes place behind the scenes. For testing and debugging purposes, though, you'll probably want to make Word visible so you can see

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what's happening. To make the window visible, set its `Visible` property to `True`, as shown here:

```
Wrd.Visible = True
```

When Word and a document are both open, VBA can refer to the document as *objVar*`.ActiveDocument` (where, once again, *objVar* matches the object variable name, which is `Wrd` in this example). The `ActiveDocument` object, in turn, contains a `Bookmarks` collection, which contains a list of all the bookmarks in the document.

The following statement begins a `With...End With` block that defines the current document's `Bookmarks` collection (`Wrd.ActiveDocument.Bookmarks`) as the item to which all properties to follow (up to `End With`) will be applied:

```
'Replace each bookmark with current data.
With Wrd.ActiveDocument.Bookmarks
```

Within the `With...End With` block, you can refer to any bookmark by name by using the syntax `.Item(`*bookmarkName*`)` where *bookmarkName* is the name of the bookmark as defined in the Word document. Each bookmark has a `.Range` property, which refers to everything that's contained within the bookmark. The `.Range` property in turn has a `.Text` property, which refers specifically to the text within the bookmark. Thus, the statement

```
.Item("AddressLines").Range.Text = AddyLineVar
```

says, *Change whatever text is currently in the bookmark named* `AddressLines` *to whatever is currently in the variable named* `AddyLineVar`.

In the following code, I change the `TodaysDate` bookmark to the current date, the `AddressLines` bookmark to the contents of the `AddyLineVar` variable, and the `Salutation` bookmark to whatever is in the variable named `SalutationVar`:

```
    .Item("TodaysDate").Range.Text = Date
    .Item("AddressLines").Range.Text = AddyLineVar
    .Item("Salutation").Range.Text = SalutationVar
End With
```

Onscreen, the document template now contains the complete form letter with all the right information. This next statement prints the form letter:

```
'Print the letter.
Wrd.ActiveDocument.PrintOut
```

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The following statement closes the letter without saving it. (There's no need to save the letter after it's printed because you'll always have the document template to work with.)

```
'All done. Close up (no need to save document)
Wrd.ActiveDocument.Close wdDoNotSaveChanges
```

These two lines close Microsoft Word and end the procedure:

```
    Wrd.Quit

End Sub
```

Figure 14-9 shows an example of using the procedure. There I chose a customer named Tori Pines from the Access form and then clicked the Merge to Word Letter button. The form letter that you see in the background is the result, with the date, address lines, and salutation all in place. The code is written to actually print the letter, so you'd never actually see the form on top of the Word document. (I had to superimpose the form there.) However, you would get a printed copy of the letter shown in the figure.

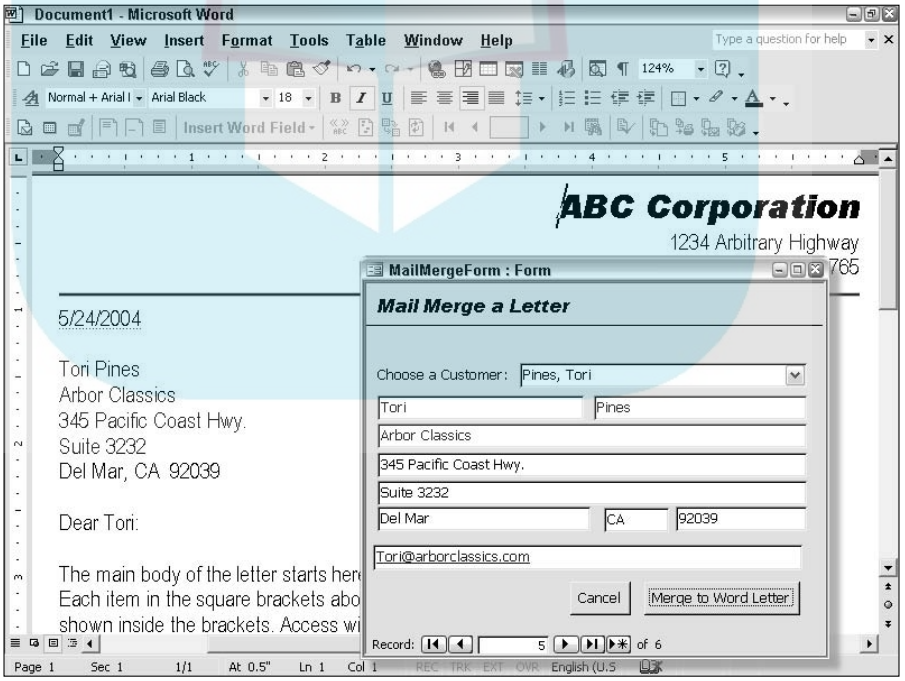

Figure 14-9: Record from the form merged into a form letter.

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Interacting with Microsoft Excel

Microsoft Excel is a great program for playing what-if scenarios with data because it lets you plug data and formulas into cells in whatever manner you wish. Excel isn't good, however, at managing large volumes of data. For large volumes of data, you need a database like Microsoft Access.

Microsoft Access can certainly do any math calculations that Excel can do. Playing what-if scenarios with data in Access is not so easy, though, because you need to get queries and/or forms involved. It's just plain difficult to experiment with what-if scenarios in Access.

Sometimes, the data you need for your worksheet might actually come from an Access database. For example, say you manage all your orders in an Access database. Every now and then you want to grab the total sales from all your orders into a worksheet and use that value to play around with your data.

You could, of course, just open Excel and type in the total sales value — or even copy and paste it from some form in Access. Optionally, you could automate the whole thing by creating a button on some Access form that opens the worksheet and plugs in the total sales amount for you. Look at an example of Automation that does just that.

Creating the worksheet

The first step is to create an Excel worksheet that contains a blank cell that gets its values from Access. Give the cell a name so that you can refer to that cell by name in VBA code. For example, in Figure 14-10, I create a worksheet named `My Sheet.xls`. Cell B3 in that worksheet is named `FromAccess`.

To name a cell or range in Excel, click the cell or select the cells that you want to name. Then type a name into the Name box (where `FromAccess` appears in Figure 14-10) and press Enter. For more information, search Excel's Help for *name cells*.

For the sake of example, say I save that worksheet in my My Documents folder with the name `My Sheet.xls`. In Windows XP, where I'm currently working under the user account name Alan, the complete path to that worksheet is

```
C:\Documents and Settings\Alan\My Documents\My Sheet.xls
```

That's important to know because VBA won't be able to find the worksheet without the complete path and filename.

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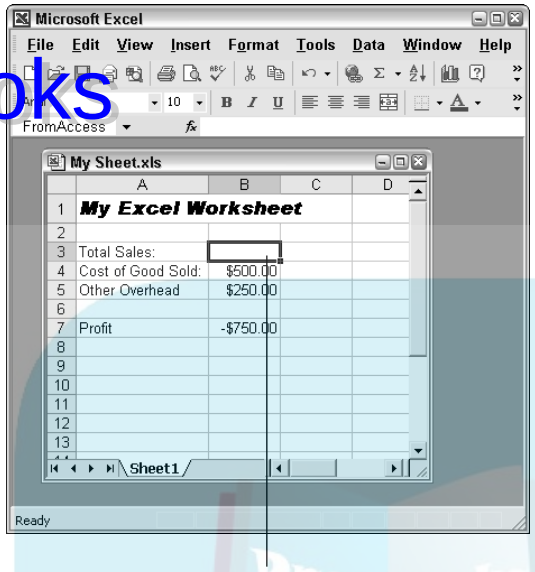

Figure 14-10: Sample Excel worksheet with a cell named FromAccess.

Creating a query and a form

After you create and save the worksheet, you can close Excel and open Access. In Access, you need to create a query that can do the calculations and also create a form that can display the appropriate value to copy to the Excel sheet. For this example, I create a totals query in Access that totals all the sales for each product from tables named `Products` and `Order Details` in a sample database. Figure 14-11 shows that query, named `Order Summary Totals Qry`, in Design view (left) and Datasheet view (right).

Next, I create a form that's bound to `Order Summary Totals Qry`. In Design view, I set the Form's `Default View` property to `Continuous Forms` so that the detail band displays all the records from the underlying query. In the Form Footer of that form, I add a calculated control named `GrandTotal` that contains the expression `=Sum([TotalSales])` to display the grand total of all the `TotalSales` values. I also create a button named `ExportBttn`. Figure 14-12 shows the form in Design (left) and Form (right) views.

As always, when using external applications, you must choose Excel's object library (`Microsoft Excel xx.x Object Library`) in the References dialog box before writing the code that follows.

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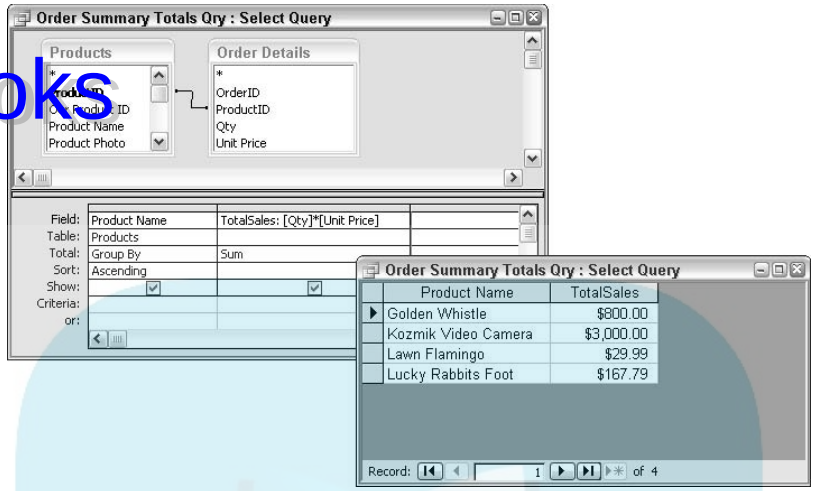

Figure 14-11: Sample query to total sales from orders in a database.

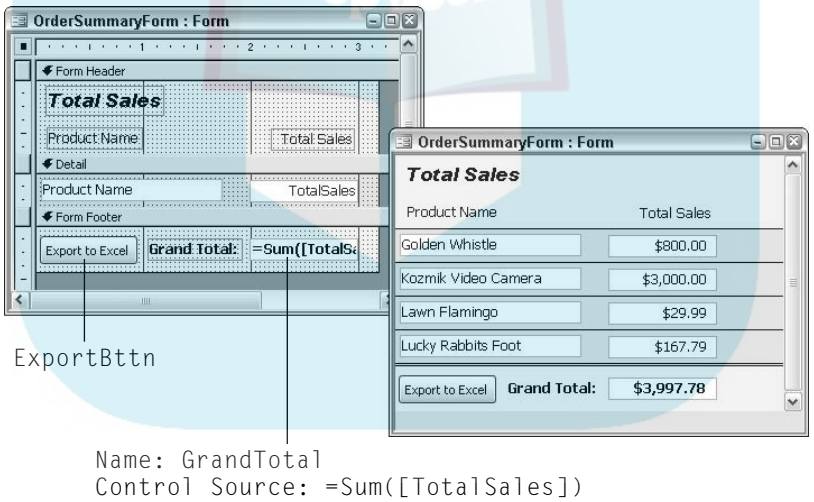

Figure 14-12: Sample form named `Order Summary Form`.

Writing the Excel code

With the query and form squared away, the next step is to write VBA code that can open the Excel sheet and copy the value in the control named `GrandTotal` to the cell named `FromAccess` in the `My Sheet.xls` worksheet. You can attach that to the `ExportBttn` `On Click` event. The entire procedure is shown here in Listing 14-3.

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Listing 14-3: Procedure to Copy Access Form Data to an Excel Worksheet

```
Private Sub ExportBttn_Click()

    'Declare a variable named MySheetPath as String.
    Dim MySheetPath As String

    'Note: You must change the path and filename below
    'to an actual Excel .xls file on your own computer.
    MySheetPath="C:\Documents and Settings\Alan\My Documents"
    MySheetPath = MySheetPath + "\My Sheet.xls"

    'Set up object variables to refer to Excel and objects.
    Dim Xl As Excel.Application
    Dim XlBook As Excel.Workbook
    Dim XlSheet As Excel.Worksheet

    'Open an instance of Excel, open the workbook.
    Set Xl = CreateObject("Excel.Application")
    Set XlBook = GetObject(MySheetPath)

    'Make sure everything is visible on the screen.
    Xl.Visible = True
    XlBook.Windows(1).Visible = True

    'Define the topmost sheet in the Workbook as XLSheet.
    Set XlSheet = XlBook.Worksheets(1)

    'Copy GrandTotal to FromAccess cell in the sheet.
    XlSheet.Range("FromAccess").Locked = False
    XlSheet.Range("FromAccess") = Me!GrandTotal

    'Boldface the new value (optional).
    XlSheet.Range("FromAccess").Font.Bold = True

    'Save the sheet with the new value (optional).
    XlBook.Save

    'Close the Access form (optional).
    DoCmd.Close acForm, "OrderSummaryForm", acSaveNo

    'Clean up and end with worksheet visible on the screen.
    Set Xl = Nothing
    Set XlBook = Nothing
    Set XlSheet = Nothing
End Sub
```

Even though the procedure is just an example, it illustrates many techniques for manipulating Excel and worksheets from Access VBA. Taking it one bit at a time, the first line, as always, names the procedure. In this case, the procedure

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is tied to the `On Click` event of `ExportBttn`, so the procedure name is `ExportBttn_Click()`:

```
Private Sub ExportBttn_Click()
```

In this example, the code will change the contents of an Excel workbook named `My Sheet.xls`, stored in the My Documents folder of a user named Alan on a Windows XP computer. The following statements create a string variable named `MySheetPath` and store the lengthy path name, `C:\Documents and Settings\Alan\My Documents`, in that variable. (The only reason I split it into multiple lines was to get the code to fit within the margins of this book):

```
'Declare a variable named MySheetPath as String
Dim MySheetPath As String

'Note: You must change the path and filename below
'to an actual Excel .xls file on your own computer.
MySheetPath="C:\Documents and Settings\Alan\My Documents"
MySheetPath = MySheetPath + "\My Sheet.xls"
```

Opening Excel and a workbook

The next step in this sample procedure is to open Excel and the workbook. First, you need to declare some object variables so you'll have short names to use for these objects later in the code. An Excel workbook is actually two objects: The workbook as a whole is a `Workbook` object; each sheet (page) in the workbook is a `Worksheet` object. So you can actually set up three object variables:

- One for Excel (of the type `Excel.Application`)
- One for the workbook (of the type `Excel.WorkBook`)
- One for a specific sheet within that workbook (of the type `Excel.Worksheet`)

In the following lines of code, I assign each of these object types named `Xl`, `XlBook`, and `XlSheet`:

```
'Set up object variables to refer to Excel and objects.
Dim Xl As Excel.Application
Dim XlBook As Excel.Workbook
Dim XlSheet As Excel.Worksheet
```

With the object variables declared, you can start assigning specific objects to them. The following statement opens an instance of Microsoft Excel and makes the object variable name `Xl` refer specifically to that open instance of Excel:

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```
'Open an instance of Excel, open the workbook.
Set Xl = CreateObject("Excel.Application")
```

After Excel is open, you can use the `GetObject()` function to open a specific file and assign it to the workbook object. The syntax is

```
Set objectVarName = GetObject(filePathName)
```

where *`objectVarName`* is the object variable name declared as an `Excel.Workbook` (`XlBook` in this example), and *`filePathName`* is the complete path and filename of the worksheet to open (previously stored in the variable named `MySheetPath` in this example). The next statement in the procedure uses `GetObject()` to open the `My Sheet.xls` workbook:

```
Set XlBook = GetObject(MySheetPath)
```

One thing that you always need to be aware of is that when you use Automation (that is, VBA) to open an instance of a program, the program usually isn't visible onscreen. In the case of Excel, even an open workbook isn't necessarily visible. You have to specifically tell Excel to make its first document window (referred to as `XlBook.Windows(1)` in VBA) visible. The following lines of code ensure that Excel and the workbook are visible onscreen:

```
'Make sure everything is visible on the screen.
Xl.Visible = True
XlBook.Windows(1).Visible = True
```

The code still needs to set a reference to the first sheet on the open workbook. You can use the workbook's `Worksheets` collection with a subscript to refer to a specific sheet by number. For example, `.Worksheets(1)` refers to the first (topmost) page of a workbook — the one that's automatically visible when you first open the workbook. In the following statement, I assign that topmost sheet to the object variable `XlSheet`:

```
'Define the topmost sheet in the Workbook as XLSheet.
Set XlSheet = XlBook.Worksheets(1)
```

Referring to worksheet cells from VBA

After you set a reference to the worksheet, you can use its `.Range` property to refer to any cell in the worksheet. There are several ways to use the property. You can refer to a single cell by its address in the worksheet. For example, assuming that the following object variable name `XlSheet` refers to an open worksheet, the following expression refers to cell A1 in that sheet:

```
XlSheet.Range("A1")
```

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You can also specify a range by using the syntax *objectVarName*.`Range(`*startCell*`:`*endCell*`)` where *startcell* and *endCell* are both cell addresses. For example, the following expression refers to the range of cells extending from cell B3 to cell F20:

```
XlSheet.Range("B3:F20")
```

If you've previously named a cell or range in the worksheet, you can use that name in place of a cell address. For example, this statement refers to a cell or range named `FromAccess`:

```
XlSheet.Range("FromAccess")
```

To change the contents of a cell in a worksheet, follow the cell reference by an = sign and the value that you want to store in that cell. For example, this statement stores the words Howdy World in cell C2:

```
XlSheet.Range("C2") = "Howdy World"
```

This statement stores the number 100 in cell C3:

```
XlSheet.Range("C3") = 100
```

To put a literal date in a cell, enclose the date in # symbols. For example, this expression stores the date 12/31/05 in cell C4:

```
XlSheet.Range("C4") = #12/31/2005#
```

To put the current date into a cell, use the built-in `Date()` function without the parentheses, as shown here, where cell C5 will receive the current date as its value:

```
XlSheet.Range("C5") = Date
```

To place a formula in a cell, use the standard Excel syntax but place the whole formula inside quotation marks. For example, the following statement places the formula =Sum(D4:D10) in cell D11 of the worksheet:

```
XlSheet.Range("D11") = "=Sum(D4:D10)"
```

Note that you must still precede the formula with an = sign, inside the quotation marks, to ensure that the new cell content is treated as a formula rather than as a string of text.

Getting back to the sample procedure, the worksheet is open and visible at this point in the procedure. The next step is to copy the value displayed in the `GrandTotal` control on `OrderSummaryForm` into the cell named `FromAccess` in the worksheet. To play it safe, the following statements first make sure that the cell isn't locked (`XlSheet.Range("FromAccess").Locked = False`).

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Then the next statement makes the content of the cell named `FromAccess` equal to the values stored in the form's `GrandTotal` control:

```
'Copy GrandTotal to FromAccess cell in the sheet.
XlSheet.Range("FromAccess").Locked = False
XlSheet.Range("FromAccess") = Me!GrandTotal
```

At this point, the job is actually complete. The procedure could end right there with an `End Sub` statement. Just to illustrate a technique for formatting cells from VBA, I added the following statement to boldface the `FromAccess` cell in the worksheet:

```
'Boldface the new value (optional).
XlSheet.Range("FromAccess").Font.Bold = True
```

You'll see other techniques for formatting spreadsheet cells in a moment. For now, continue on with the sample procedure. The next statement simply saves the worksheet with the new data in place. Again, this step is entirely optional.

```
'Save the sheet with the new value (optional).
XlBook.Save
```

Now that the spreadsheet is open and the `FromAccess` cell has its new value, it's really not necessary to keep `OrderSummaryForm` open. This statement closes that form:

```
'Close the Access form (optional).
DoCmd.Close acForm, "OrderSummaryForm", acSaveNo
```

At this point, the procedure has finished its job, and there's really nothing left to do. Just to keep things tidy, the following statements break the bonds between the object variables and Excel objects. Think of this as the programming equivalent of tying up loose ends. Then the procedure ends.

```
    'Clean up and end with worksheet visible on the screen.
    Set Xl = Nothing
    Set XlBook = Nothing
    Set XlSheet = Nothing
End Sub
```

It's worth noting that only one statement in the whole procedure, `XlSheet.Range("FromAccess") = Me!GrandTotal`, actually copies the value from the form control to the Excel worksheet. All the code preceding that statement is just getting things open and onscreen so that the statement can execute. All that code is boilerplate for opening an instance of Excel and a workbook. As you'll see in the next example, you can use most of that code, as-is, to do something different — copy an entire table, or the results of any query, to a worksheet.

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To copy a table or query results to an Excel worksheet, you first need to create a recordset. You can use the general techniques described in Chapter 7 to create a `Select` query that produces the records you want to export. Then you can copy and paste its SQL statement into code to create a recordset in code. Then, thanks to Excel's `CopyFromRecordset method`, the code can copy the whole recordset to any place in the worksheet with a single command.

For example, the hefty-looking chunk of code in Listing 14-4 copies all records produced by `OrderSummaryQry` (refer to Figure 14-11) to a worksheet named `RecordsetSheet.xls` (for lack of a better name). As intimidating as it all looks, it's mostly a bunch of copy-and-paste code that I just lifted from other procedures:

Listing 14-4: Example of Copying a Recordset to an Excel Worksheet

```
'We'll start by creating a recordset named MyRecordset.
Dim cnn As ADODB.Connection
Set cnn = CurrentProject.Connection
Dim MyRecordset As New ADODB.Recordset
MyRecordset.ActiveConnection = cnn

'Build the SQL statement (swiped from a query).
Dim MySQL As String
MySQL = "SELECT [Product Name], Sum([Qty]*[Unit Price])"
MySQL = MySQL + " AS TotalSales FROM [Order Details]"
MySQL = MySQL + " INNER JOIN Products ON"
MySQL = MySQL + " [Order Details].ProductID ="
MySQL = MySQL + " Products.ProductID"
MySQL = MySQL + " GROUP BY Products.[Product Name]"
MySQL = MySQL + " ORDER BY Products.[Product Name]"

MyRecordset.Open MySQL
'Now MyRecordset contains records to be exported.

'Now for the Excel rigmarole.
'Define the path to the workbook, save it as MySheetPath.
Dim MySheetPath As String
'Note: You must change the path and filename below
'to an actual Excel .xls file on your own computer.
MySheetPath = "C:\Documents and Settings\All Users\Documents"
MySheetPath = MySheetPath + "\Worksheets\RecordsetSheet.xls"

'Set up object variables to refer to Excel and objects.
Dim Xl As Excel.Application
Dim XlBook As Excel.Workbook
Dim XlSheet As Excel.Worksheet

'Open an instance of Excel, open the workbook.
Set Xl = CreateObject("Excel.Application")
```

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```
Set XlBook = GetObject(MySheetPath)

'Make sure everything is visible on the screen.
Xl.Visible = True
XlBook.Windows(1).Visible = True

'Define the topmost sheet in the Workbook as XLSheet,
Set XlSheet = XlBook.Worksheets(1)

'Copy the recordset to worksheet starting at cell B3.
XlSheet.Range("B3").CopyFromRecordset MyRecordset

'Clean up and end with worksheet visible on the screen.
MyRecordset.Close
Set cnn = Nothing
Set Xl = Nothing
Set XlBook = Nothing
Set XlSheet = Nothing
```

I didn't put the code above between `Sub...End Sub` statements. You could just attach the code to any command button's `On Click` event to run it when you want it run. To show how the code isn't as intimidating as it looks, let me tell you how I wrote it.

First, before I even wrote any code, I created an Excel worksheet, added a heading in cell A1, did a little formatting, and saved it in my Shared Documents folder as `RecordsetSheet.xls` (for lack of a better name). So I'll want my VBA code to open that workbook.

I also created a query in Access that defines the records I want to copy to the worksheet. I made sure that query was working and also that its Datasheet view showed the exact data I want to copy to Excel. Then I closed and saved that query.

With the worksheet and query in place, I started writing the code. I knew that I'd need two major chunks of code here: one chunk to create the recordset, and another to open the worksheet. I already have boilerplate code (from Chapter 7) for creating an ADODB (ActiveX Data Objects Database) recordset, so I just did a quick copy and paste of that code into a new procedure.

Most of the copy-and-paste code was fine. I just had to delete all the MySQL = statements so I could build a new SQL statement. To get that new statement, I opened my previously defined and test query in SQL view and copied its SQL statement (minus the semicolon at the end) into the Code window.

In the Code window, I set about breaking that lengthy SQL statement into smaller chunks. (***Note:*** I did that only to make it all fit within the margins of this book.) In the following code fragment, italics indicate the lines that I had to change. All other lines are straight from a copy and paste:

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```
'We'll start by creating a recordset named MyRecordset.
Dim cnn As ADODB.Connection
Set cnn = CurrentProject.Connection
Dim MyRecordset As New ADODB.Recordset
MyRecordset.ActiveConnection = cnn

'Build the SQL statement (swiped from a query).
Dim MySQL As String
MySQL = "SELECT [Product Name], Sum([Qty]*[Unit Price])"
MySQL = MySQL + " AS TotalSales FROM [Order Details]"
MySQL = MySQL + " INNER JOIN Products ON"
MySQL = MySQL + " [Order Details].ProductID ="
MySQL = MySQL + " Products.ProductID"
MySQL = MySQL + " GROUP BY Products.[Product Name]"
MySQL = MySQL + " ORDER BY Products.[Product Name]"

MyRecordset.Open MySQL
'Now MyRecordset contains records to be exported.
```

That takes care of the recordset problem. Now onto opening Excel and my workbook. This was another copy and paste job, this time from the procedure shown in the preceding example. The path and filename to the workbook will be different in this procedure, so I had to change those lines of code (again shown in italics here), but the rest is exactly what I pasted into the procedure:

```
 'Now for the Excel rigmarole.
'Define the path to the workbook, save it as MySheetPath.
Dim MySheetPath As String
'Note: You must change the path and filename below
'to an actual Excel .xls file on your own computer.
MySheetPath = "C:\Documents and Settings\All Users\Documents"
MySheetPath = MySheetPath + "\Worksheets\RecordsetSheet.xls"

'Set up object variables to refer to Excel and objects.
Dim Xl As Excel.Application
Dim XlBook As Excel.Workbook
Dim XlSheet As Excel.Worksheet

'Open an instance of Excel, open the workbook.
Set Xl = CreateObject("Excel.Application")
Set XlBook = GetObject(MySheetPath)

'Make sure everything is visible on the screen.
Xl.Visible = True
XlBook.Windows(1).Visible = True

'Define the topmost sheet in the Workbook as XLSheet,
Set XlSheet = XlBook.Worksheets(1)
```

At this point in the code, I have my recordset and I have my open worksheet. Because this procedure copies a recordset, the next statement is brand-new,

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but it's not too terribly difficult to figure out what it's doing even if you just read it and take a wild guess:

```
'Copy the recordset to worksheet starting at cell B3.
 XlSheet.Range("B3").CopyFromRecordset MyRecordset
```

The preceding statement is all that you need to copy a recordset to an open Excel worksheet. The `B3` in the statement just moves the cursor to cell B3. Then `CopyFromRecordset MyRecordset` copies the recordset, starting at cell B3, into the worksheet. Nothing to it!

The rest of the code is just clean up, but that code is just a straight copy and paste from the other two procedures as well. So you see, as big and intimidating as the procedure looks, it really required very little typing or programming on my part. I used boilerplate code — that I know already works — to write at least 90 percent of the procedure! And that's the way you write code. Use what already works, when you can. Create new stuff only when you have to.

Running Excel macros from Access

Speaking of writing code by using what works and creating only what you have to, consider formatting an Excel worksheet. When you write a procedure that copies data from Access to Excel, you might be tempted to write some code to format the worksheet as well, but that would be tedious and unnecessary. That's because in Excel, you could just record a macro while you're formatting the sheet. Then save that macro, and run it from your Access VBA program.

For example, rather than add a bunch of code to either of the procedures above to format the worksheet, you could just open the worksheet and move the cursor to some known starting point — say cell A1. Then do the following:

1. **Choose Tools➪Macro➪Record New Macro.**
2. **Give the macro an easily remembered name (like Format Sheet) and then click OK.**
3. **Format your worksheet using whatever techniques you wish.**

   For example, you might

   - Click a column heading (like B) and choose Format➪Column➪AutoFit Selection to size the column to its contents.
   - Click a column heading, choose Format➪Cells, and select some format like Currency.
   - Move the cursor to a cell and type a formula.

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While recording a macro, try to use the Name box as much as possible to move the cursor to a specific cell. That way, if you move the cell or range later, the macro will go to its new location rather than the old location.

4. **Keep doing whatever you have to do to make the sheet look right, and then click the Stop Recording button.**

To test the macro, choose Tools➪Macro➪Macros from the Excel menu bar. Click the macro name and choose Run. The macro will execute. If all is well, you're done. You can close and save the worksheet in the usual manner and close Excel as well.

The recorded macro is also VBA code. If you choose Tools➪Macro➪Macros, click a macro name, and then click Edit, the macro opens in the VBA editor. Each step in the procedure that you see was recorded while you were recording the macro.

Back in your Access VBA procedure, you'll most likely want to run the macro after your code copies new content to the worksheet — for example, just under the `XlSheet.Range("FromAccess") = Me!GrandTotal` statement in the Listing 14-3, or under `XlSheet.Range("B3").CopyFromRecordset MyRecordset` in Listing 14-4. The syntax for running a macro in the currently open workbook, from Access, is

```
objVar.Run ("macroName")
```

where *objVar* is the object variable to which you've assigned the Excel application (`Xl` in previous examples), and *macroName* is the name of the macro in the worksheet that you want to run. For example, from any Access VBA procedure, the following statement runs the macro named `FormatSheet` in the currently open worksheet (assuming the open worksheet contains a macro named `FormatSheet`):

```
Xl.Run ("FormatSheet")
```

If you want to put the cursor in a specific field before the macro executes, use the syntax *objVar*`.Range("`*Address*`").Select` before running the macro. For example, the following code positions the cursor to cell A1 and then executes the macro named `FormSheet` in the currently open workbook:

```
'Go to cell A1.
XlSheet.Range("A1").Select

'Run macro named FormatSheet.
Xl.Run ("FormatSheet")
```

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Part VI

The Part of Tens

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In this part . . .

What *For Dummies* book would be complete without a Part of Tens? Ten is such a nice number to work with, given our ten fingers and all. The Ten Commandments of Writing VBA Code cover the main strategies that you want to adopt to avoid going crazy trying to get VBA to do anything. Then there are the top ten nerdy programming things you're most likely to want to do almost from Day 1 of using VBA. And check out the way-more-than ten shortcut keys listed here. I figured that if I were gonna stick some shortcut keys here, why limit it to ten? I'll splurge a little on those because they're easy.

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Chapter 15

Ten Commandments of Writing VBA

1. Thou Shalt Not Harbor Strange Beliefs about Microsoft Access

VBA is a programming language for manipulating objects in Microsoft Office application programs. As described in this book, VBA is a programming language for manipulating objects and their properties in Access. Before you can write code to manipulate objects programmatically, you must first understand the objects themselves.

Therefore, you really have to understand the purpose of tables, queries, forms, reports, macros, controls on forms, expressions, and other Access concepts before you even think about learning VBA. If thou tryeth to learn or use VBA without first knowing Access, thou shalt surely break The Tenth Commandment for all thy programming days.

11. Thou Shalt Not Use VBA Statements in Vain

Or, to put this another way, *Thou shalt not attempt to make up thy own programming language.* (As a young boy, I was always a little fuzzy on the phrase *in vain* in the Catholic version of the Ten Commandments. Here, *in vain* means *without a clue.*)

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You need to know the exact spelling and syntax of every VBA keyword and every Access object that you name. If the correct thing to type is

```
DoCmd.OpenForm "myForm", acNormal, , , acFormEdit
```

don't assume that something reasonably close, like any of the examples that follow, will work:

```
Do Cmd.OpenForm "myForm", acNormal, , , acFormEdit
DoCmd.Open Form "myForm". acNormal..acFormEdit
DoCmd.OpenForm "myForm", acNormal, , , acFrmEdit
DoCmd.Open Form "myForm", acNormal, , , acFormEdit
DoComnd.OpenForm "myForm", acNormal, , , acFormEdit
DoCmd.OpenForm "myForm", "acNormal", , , "acFormEdit"
```

On casual observation, you might think any of the preceding six lines would do in place of the original example. In fact, each of the six preceding statements contains a syntax error that would cause the line to fail.

111. Remember to Keep Holy VBA Syntax

Every VBA statement has strict rules of syntax that define the exact spelling, punctuation, and order of things in that statement. They're not *suggestions:* They're really *rules* that must be obeyed if you expect your code to work at all. (Okay, so I'm still harping on the Second Commandment here.) Anyway, the first amendment to this commandment follows.

If thou not a clue haveth what that box under the cursor in Figure 15-1 is about, or why the ***FormName*** is in boldface there, thou shalt study in earnest how to understand syntax in Chapter 3. Woe be to those who heed not this warning, for surely they will live their remaining programming days breaking The Tenth Commandment.

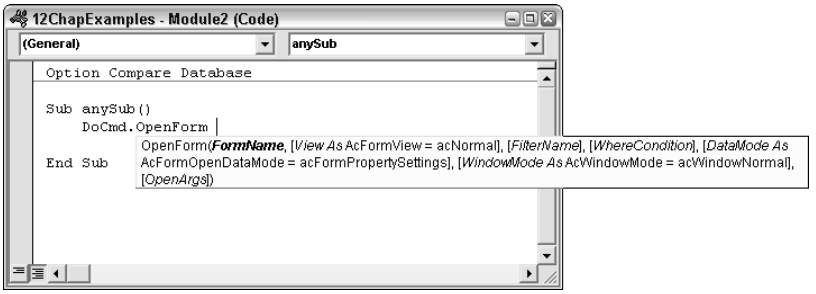

Figure 15-1: Thou shalt not be clueless.

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IV. Honor Thy Parens and Quotation Marks

Punctuation marks count big time in all programming languages. Many come in pairs. For example, you will never find a VBA function or statement that uses only one parenthesis. For every open parenthesis, there must be exactly one closed parenthesis.

You can do yourself a favor by getting in the habit of always typing both punctuation marks immediately when you know that two are required. For example, when you have to type something like **IsNull([Last Name])**, you can type it like a programmer rather than like a normal person. Here's how a programmer would type that. First type

```
IsNull()
```

The syntax of `IsNull()` requires both parentheses, so now both parentheses are typed. If you don't type both parentheses when you're thinking about them, you'll probably forget to type the closing parenthesis later. (Compile error!)

Next, a programmer would type the square brackets inside the parentheses, like this:

```
IsNull([])
```

Once again, if you type the opening bracket, you know you're gonna need a closing bracket, so just type it while it's fresh in your mind. Finally, type the thing in the middle of it all:

```
IsNull([Last Name])
```

The same goes for quotation marks. For example, to type `MyText = "Hello World"`, first type

```
MyText = ""
```

You can't forget to type the closing quotation mark now because it's already there. Then type the stuff that goes inside the quotation marks:

```
MyText = "Hello World"
```

The abbreviated version of the Fourth Commandment is *Thou shalt not type like a normal person.*

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V. Thou Shalt Not Guess

When it comes to anything having to do with computers, guessing rarely works. When it comes to database management or programming, guessing *never* works. Woe be to he who attempts to create a database or code by guessing, for surely he will layeth down in green padded cells, breaking The Tenth Commandment for all his remaining days.

VI. Thou Shalt Not Commit Help Adultery

Microsoft Access is a computer program that has its own built-in Help system. The VBA editor is a separate program that has its own built-in Help system. They are not one and the same. For help on Access matters, use Access Help (top of Figure 15-2). For help on VBA, use VBA Help (bottom of same figure). If in doubt, try both. Don't just try one and give up. Guesseth not.

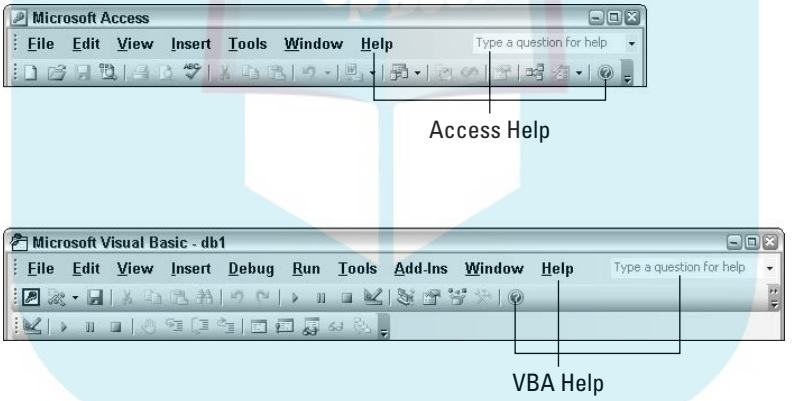

Figure 15-2: Thou shalt seek relevant facts, for nothing else matters.

Thou shalt use taskbar buttons or press Alt+F11 to switch between Access and VBA editor program windows.

When all else fails, thou shalt go to `http://search.microsoft.com` and search for more information. Thou shalt include relevant words like *Access VBA* in all searches, lest thou end up with 196,342 irrelevant links to sift through.

Should thou seeketh knowledge through Google, or any other whole-Web search engine, thou shalt include even more relevant words, like *Microsoft Office Access VBA* lest thou endeth up with more links than could be viewed in 100 lifetimes.

VII. Thou Shalt Steal Whenever Possible

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The more you type, the more likely you are to make typographical errors. Whenever there's an option to choose, rather than type (as in Figure 15-3), always choose. Woe be to those who ignoreth the options and maketh up their own words, and those who choose options at random, for they shall not inherit the Earth nor a single working line of code.

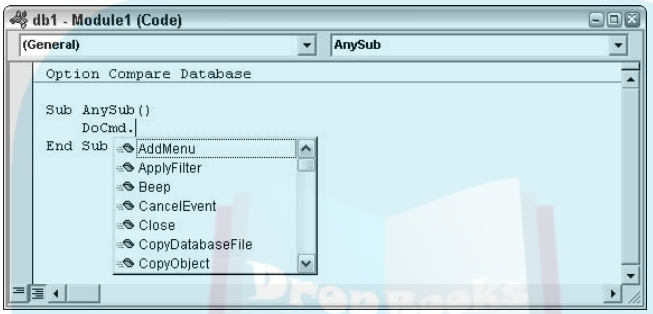

Figure 15-3: Thou shalt not ignore options nor choose options cluelessly.

If you can find the code on some Web page somewhere, or any place from which you can copy and paste, go ahead and copy and paste. Woe be to those who attempt to write code before learning about copy and paste, for one must learn to crawl (use a computer) before one learns to pole vault (program a computer).

VIII. Thou Shalt Not Bear False Witness against Thy Object Browser

Everything in an Access database is an object. VBA exists to manipulate those objects programmatically. Thy Object Browser is thy Word and Shepard. It leadeth you to code that actually works. It helpeth to remind you that `Forms!` and `Reports!` refer to open objects and that `AllForms` and `AllReports` work with closed objects.

For example, the Object Browser helpeth you to discriminate between the `DoCmd` *object* and the `DoCmd` *property*. It taketh you to the land of truth and facts, and bestoweth upon you names and words that actually work in VBA.

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Thy Object Browser is always available in the VBA editor. Seeketh (press F2), and ye shall find. He who believeth that just opening the Object Browser will solveth some problem hath lost his way, and shall wander in dark lands of meaningless Babel for all his programming days. For the laying of eyes on the Object Browser (mouth agape in a fish-like stare) is not enough to enter the land of light and truth. Only he who learneth to use thy Object Browser successfully shall make it beyond the Tower of Babble, to the pearly gates of code-writing heaven.

He who knoweth not an Object Browser from a Web browser, nor a property from pastrami, can seek enlightenment in Chapter 5, which covers objects and collections.

IX. Thou Shalt Not Covet Thy Neighbor's Knowledge

Nobody was ever born already knowing how to use a computer, already knowing how to do database management, or as a fresh out-of-the-womb VBA programmer. Everyone who already knows this stuff went through the same learning curve you're faced with. Thou shalt not consider one's self stupid for not knowing things from birth, for such is the plight of all humankind. Thou shalt earn and learn thy skills like everyone else — by learning, doing, and knowing how to get the information you need when you need it.

X. Thou Shalt Not Scream . . .

. . . for screaming helpeth not. Nor do wishing, hoping, guessing, opinions, beliefs, anger, envy, wrath, sloth, gluttony, nor sadness. For there is only one true saver of programmers' souls, and that is The Facts. Only facts can saveth your soul. Anything else is a futile waste of time and energy.

I was tempted to add *praying* after . . .*wishing, hoping* above. Because this is the Ten Commandments of VBA, I figured I'd leave that out of the list of futile strategies. In the interest of keeping things practical, I'll add a 21st-century Tenth Commandment amendment here:

Thou shalt press F1 after every prayer.

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Chapter 16

Top Ten Nerdy VBA Tricks

In This Chapter

- Opening forms
- Dealing with controls
- Making custom messages
- Printing reports
- Using `DoCmd`

Access and VBA are both huge products in the sense that you can do about a bazillion different things with either one of them. However, when it comes to learning VBA, having a zillion options to choose from doesn't help. It only creates the unanswerable question, "Where do I start?"

From a big-picture point of view, you have to know Access before you even attempt to learn VBA. You also need to get your bearings as to how and where VBA fits into the whole Microsoft Access picture. I cover the getting-your-bearings endeavor in Part I of this book. Eventually, you'll get to the point where you're actually typing VBA code.

After you get to where you're typing code, you're back to the problems of having a zillion different things that you *could* type and knowing where to start. Well, if you were to ignore the zillion things you *could* type and keep only the top ten things that you *most likely* want to type, you'd end up with the sections that follow.

1. Open a Form from VBA

When you want a procedure to open an Access form in Form view — so that the user can see and use the form — use the `OpenForm` method of the `DoCmd` object, as follows:

```
DoCmd.OpenForm "yourFormName", acNormal
```

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but replace *yourFormName* with the name of the form that you want to open. For example, if your database contains a form named Products and you want VBA to open that form in Access, use the statement

```
DoCmd.OpenForm "Products", acNormal
```

2. See Whether a Form Is Already Open

Sometimes it's useful for a procedure to know whether a form is currently open or closed. The CurrentProject.AllForms collection contains the name of every form in the current database. Each form has an IsLoaded property that's True if the form is currently open or False if the form is closed. The syntax for using IsLoaded is

```
CurrentProject.AllForms("formName").IsLoaded
```

where *formName* is the name of a form in the current database. For example, the following expression returns True if the form named Customers is currently open or False if that form is closed.

```
CurrentProject.AllForms("Customers").IsLoaded
```

A practical example would be an If...End If block that closes the form named NewCust but only if that form is currently open:

```
If CurrentProject.AllForms("NewCust").IsLoaded Then
   DoCmd.Close acForm, "NewCust", acSaveYes
End If
```

3. Refer to an Open Form

VBA keeps track of all currently open forms in the Forms collection. To refer to an open form from a standard module, use the syntax

```
Forms![formName]
```

where *formName* is the name of the open form. For example, when the Products form is open, use

```
Forms![Products]
```

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in VBA to refer to that form as a whole. However, you typically want to refer to a specific control on the open form or perhaps a property of the form as a whole. To refer to a form property, use the syntax

```
Forms![formName].[propertyName]
```

where *propertyName* is the name of the property. For example, every form has a `RecordSource` property that contains the name of the table or query to which the form is bound. The following example refers specifically to the `RecordSource` property of the currently open form named `Products`:

```
Forms![Products].RecordSource
```

Use an exclamation point (`!`) (sometimes called a *bang*) in front of any name that you create yourself, such as the name of a form, report, field, or control on a form. Use a period/dot (`.`) to precede property names and method names that are built into Access (names that you didn't make up yourself).

To refer to a specific control on an open form, use the syntax

```
Forms![formName]![controlName]
```

where *controlName* is the name of a control on the open form. For example, the following statement refers specifically to the value stored in a control named `Product Name` on an open form named `Products`:

```
Forms![Products]![Product Name]
```

To refer to a property of a control, use the syntax

```
Forms![formName]![controlName].propertyName
```

where *propertyName* is a valid property for the control. For example, just about every control type has a `Value` property that refers to the current contents of the control. To refer to the Value property of the `Product Name` control on the currently open Products form, use

```
Forms![Products]![Product Name].Value
```

4. Move the Cursor to a Control

To move the cursor to a specific control on an open form (from within a standard module), use the syntax

```
Forms![formName]![controlName].SetFocus
```

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For example, the following VBA statements open a form named NewCust and move the cursor to a control named TaxExempt on that form:

```
'Open my NewCust form in Form view.
DoCmd.OpenForm "NewCust", acNormal

'Move the cursor to the Tax Exempt control.
Forms![NewCust]![Tax Exempt].SetFocus
```

5. Change the Contents of a Control

To change the contents of a control on an open form, use the syntax

```
Forms![formName]![fieldName].Value = newValue
```

where *newValue* is the value to assign to the control.

For example, the following statement sets the value of a field named Credit Limit on an open form named NewCust to 10,000. The syntax assumes that Credit Limit is bound to a Number or Currency field:

```
Forms![NewCust]![Credit Limit].Value = 10000
```

The following example sets the field named CustStatus on the open form named NewCust to Approved. The syntax assumes that CustStatus is bound to a Text or Memo field:

```
Forms![NewCust]![CustStatus].Value = "Approved"
```

The following statement changes the value of a Date/Time control, named DateEntered on an open form named NewCust, to the current date:

```
Forms![NewCust]![DateEntered].Value = Date
```

The following statement changes the contents of the Date/Time field named DateEntered specifically to the date January 1, 2005:

```
Forms![NewCust]![DateEntered].Value = #1/1/2005#
```

The following statement sets the value of a Yes/No field named PrintedYet to True on an open form named NewCust:

```
Forms![NewCust]![PrintedYet].Value = True
```

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6. Update a List Box or Combo Box

`ListBox` and `ComboBox` controls can show lists of data from tables or queries. A common problem with such controls occurs when the row source for the list changes while the control is open and visible on the form. List boxes and combo boxes don't recheck their record sources after the form is open, so it's easy for a list to get out of sync with what's currently in its source table or query.

VBA can force a list box or combo box to update its list immediately, via the syntax

```
Forms![formName]![controlName].Requery
```

where *formName* is the name of the open form, and *controlName* is the name of the `ListBox` or `ComboBox` control on that open form. For example, the following statement updates a `ComboBox` or `ListBox` control named `CustID` on an open form named `Customers`:

```
Forms![Customers]![CustID].Requery
```

It's not necessary (or possible) to requery a control on a closed form. If the preceding statement executes when the form named `Customers` isn't open in Form view, the statement will generate an error message.

To prevent such a statement from executing when the specified form isn't open, place the `Requery` statement in an `If...End If` block that executes the statement only if the form is open, as in the following example:

```
If CurrentProject.AllForms("Customers").IsLoaded Then
   Forms![Customers]![CustID].Requery
End If
```

7. Show a Custom Message

You can use VBA to display a simple message and an OK button on the screen. The syntax for doing so is

```
MsgBox "yourMessage"
```

where *yourMessage* is the *prompt* (the text to show), as shown in Figure 16-1.

Figure 16-1: A simple custom message with an OK button.

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For example, the following VBA statement displays the exact message box shown in Figure 16-1:

```
MsgBox "Your message here."
```

The following statement shows the text `Thank you.` in a message box:

```
MsgBox "Thank you."
```

8. Ask the User a Question

If you want your VBA code to ask the user a question and then perform some action based on the user's answer, you need to use the more complex `MsgBox` function syntax and an `If...Else...End If` block of code with the general syntax as shown here:

```
Dim variableName As Integer
variableName = MsgBox("prompt",buttons,"title")
If variableName = vbYes Then
   'Code to execute if user clicked Yes goes here.
Else
   'Code to execute if user clicked No goes here.
End If
```

where

- *`variableName`* is a name of your own choosing (such as *`Answer`*).
- *`prompt`* is the text of the question that the box displays.
- *`buttons`* is any VBA constant or sum of constants. (For a question like the one in Figure 16-2, use `vbYesNo+vbQuestion`.)
- *`title`* is the title of message box.
- *`'Code to execute if...`* represents any number of VBA statements.

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Figure 16-2: A question on the screen with Yes/No buttons.

In the following example, the statement

```
Answer = MsgBox("Did labels print OK?", vbYesNo+vbQuestion, "Question")
```

displays the message box shown in Figure 16-2. The question mark icon and Yes/No buttons are in the box courtesy of the `vbQuestion+vbYesNo` expression as the *`buttons`* argument.

```
Dim Answer As Integer
Answer = MsgBox("Did labels print OK?", vbQuestion+ vbYesNo, "Question")

If Answer = vbYes Then
      MsgBox "You clicked Yes"
Else
      MsgBox "You clicked No"
End If
```

In the preceding code example, when a user clicks a button, he just gets a little message saying which button he clicked, which serves no practical purpose. In real life, you'd replace `MsgBox "You clicked Yes"` and `MsgBox "You clicked No"` with code that actually does something useful.

9. Print a Report

If you want VBA to print a report from the current database, use the syntax

```
DoCmd.OpenReport "reportName", acViewNormal
```

where *reportName* is the name of any report in the current database. For example, the following statement prints a report named `MyLabels`:

```
DoCmd.OpenReport "MyLabels", acViewNormal
```

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In case you hadn't noticed, the DoCmd (pronounced *do command*) object shows up quite a few times in this chapter. That's because the DoCmd object lets you do lots of useful things with the tables, queries, forms, and reports in your database. In fact, now that I think of it, I suppose item number ten here should be. . . .

10. Get to Know the DoCmd Object

The DoCmd object is one of your most potent programming allies because it can do virtually anything you can do in Access's program window. When you type **DoCmd.** into the Code window, the hefty list of items that appears in the little menu (see Figure 16-3) represents various methods of the DoCmd object. Each method, in turn, represents something that the DoCmd object can do.

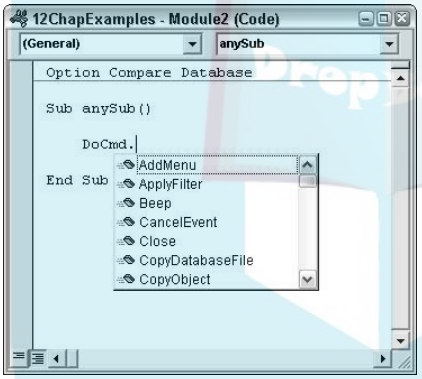

Figure 16-3: DoCmd methods in the Code window.

The DoCmd methods that you're most likely to use, especially as a beginning programmer, are summarized in Table 16-1. Like with any Access object, you can use the Object Browser to get more information on any DoCmd method.

Table 16-1 DoCmd Methods Worth Getting to Know

Goal	*DoCmd Method*
Close a form or report	DoCmd.Close
Open a form	DoCmd.OpenForm
Do a menu command	DoCmd.DoMenuItem
Open a report	DoCmd.OpenReport
Export data	DoCmd.OutputTo

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Goal	*DoCmd Method*
Print data	`DoCmd.PrintOut`
Rename an object	`DoCmd.Rename`
Run a macro	`DoCmd.RunMacro`
Run an action query	`DoCmd.RunSQL`
Save an object	`DoCmd.Save`
Select an object	`DoCmd.SelectObject`
E-mail an object	`DoCmd.SendObject`
Import/export spreadsheet	`DoCmd.TransferSpreadsheet`

You can read about the Object Browser in Chapter 5. But just as a quick head-start, in case you're already familiar with the Object Browser, you can find the `DoCmd` object in the Classes column. When you click it, you'll see its methods in the Members column. The bottom of the window shows a summary of the syntax for using the method. For details, though, you want to click the Object Browser's Help button, as shown in Figure 16-4.

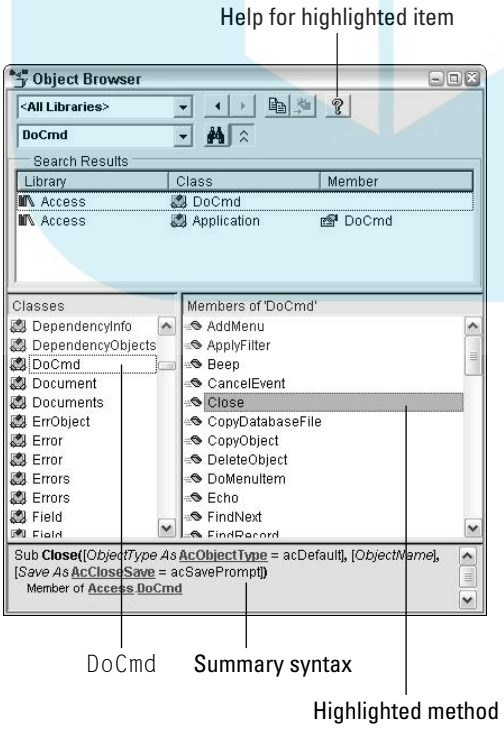

Figure 16-4: DoCmd selected in the Object Browser.

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Chapter 17

(Way More Than) Ten Shortcut Keys

In This Chapter

- Code and Immediate window shortcuts
- General VBA editor shortcut keys
- Debug shortcut keys

Code and Immediate Window Shortcuts

You'll use the VBA editor Code window to type all your Access code. The Code window supports all the standard Windows text-editing techniques, as summarized here in Table 17-1. Most keys also work in the Immediate window. The keys that don't work in the Immediate window are marked with an asterisk (*).

Table 17-1 Code and Immediate Window Shortcuts

Action	*Shortcut Key*
Move cursor right one character	→
Select character to right	Shift+→
Move cursor right one word	Ctrl+→
Select to end of word	Ctrl+Shift+→
Move cursor left one character	←
Select character to left of cursor	Shift+←
Move cursor left one word	Ctrl+←

(continued)

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Table 17-1 *(continued)*

Action	*Shortcut Key*
Move cursor to start of line	Home
Select text to start of line	Shift+Home
Move cursor to end of line	End
Select text to end of line	Shift+End
Move cursor up a line	↑
Move cursor down a line	↓
Move cursor to next procedure	Ctrl+↓
Move cursor to previous procedure	Ctrl+↑
Scroll up one screen	PgUp
Scroll down one screen	PgDn
Go to top of module/window	Ctrl+Home
Select all text to top of module/window	Ctrl+Shift+Home
Go to bottom of module/window	Ctrl+End
Select all text to bottom of module/window	Ctrl+Shift+End
Cut selection	Ctrl+X
Copy selection	Ctrl+C
Paste	Ctrl+V
Cut current line to Clipboard	Ctrl+Y
Delete to end of word	Ctrl+Delete
Delete character or selected text	Delete (Del)
Delete character to left of cursor	Backspace
Delete to beginning of word	Ctrl+Backspace
Undo*	Ctrl+Z
Indent line	Tab
Outdent line	Shift+Tab
Find*	Ctrl+F
Replace*	Ctrl+H

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Action	*Shortcut Key*
Find Next*	F3
Find Previous	Shift+F3
Get help with currently selected word	F1
Quick Info*	Ctrl+I

** Doesn't work in the Immediate window*

General VBA Editor Shortcut Keys

The shortcut keys in Table 17-2 are available throughout the VBA editor and are therefore also available in the Code window and Immediate window.

Table 17-2 General VBA Editor Shortcut Keys

Action	*Shortcut Key*
Help	F1
View Object Browser	F2
Properties	F4
View Code window	F7
Close and return to Access	Alt+Q
Switch to Access	Alt+F11
View Immediate window	Ctrl+G
View shortcut menu	Shift+F10 (or right-click)
Run a Sub/UserForm	F5
Stop code execution	Ctrl+Break

Debug Shortcut Keys

The shortcut keys in Table 17-3 apply when debugging code in the VBA editor.

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Table 17-3 Debug Shortcut Keys

Action	*Shortcut Key*
Toggle breakpoint	F9
Step into	F8
Step over	Shift+F8
Step out	Ctrl+Shift+F8
Run to cursor	Ctrl+F8
Clear all breakpoints	Ctrl+Shift+F9

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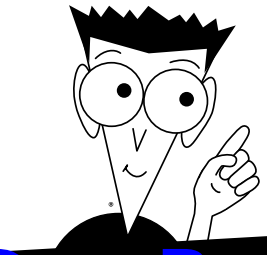

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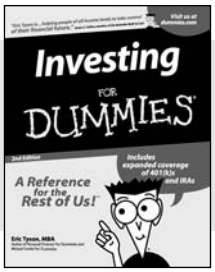

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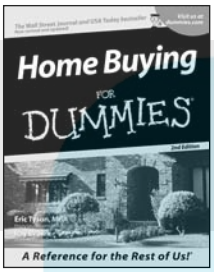

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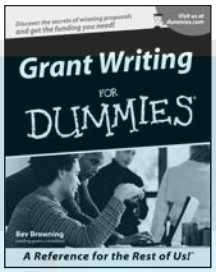

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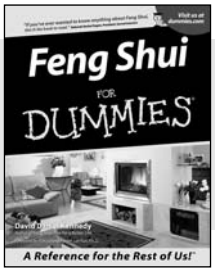

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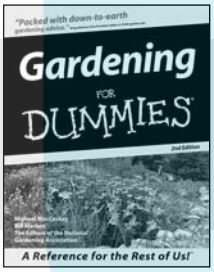

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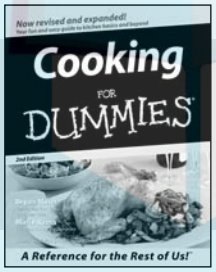

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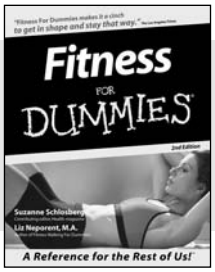

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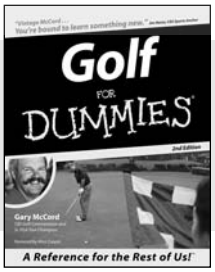

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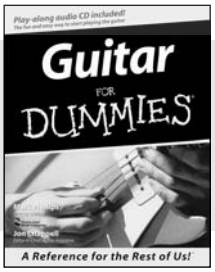

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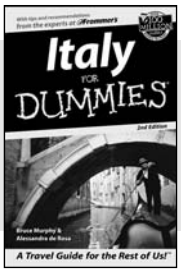

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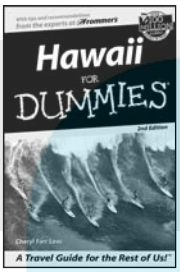

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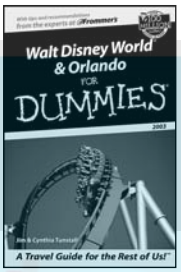

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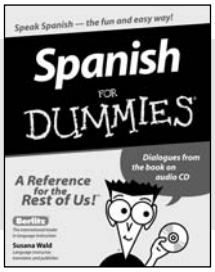

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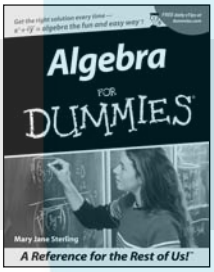

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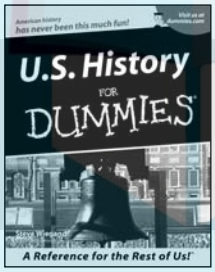

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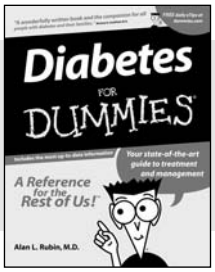

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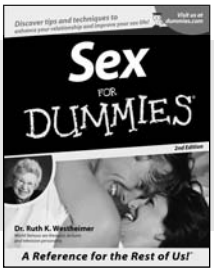

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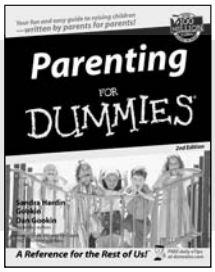

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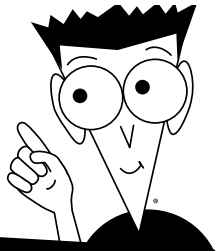

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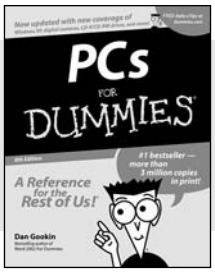

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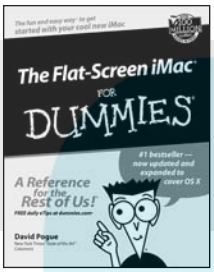

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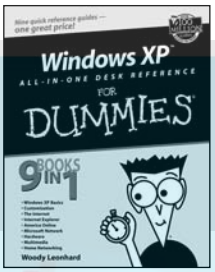

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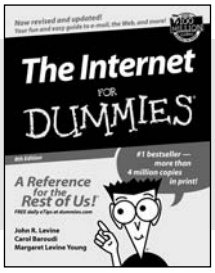

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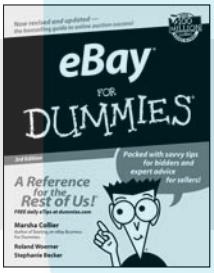

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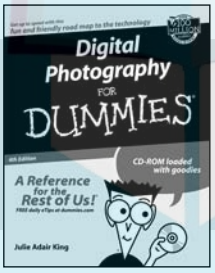

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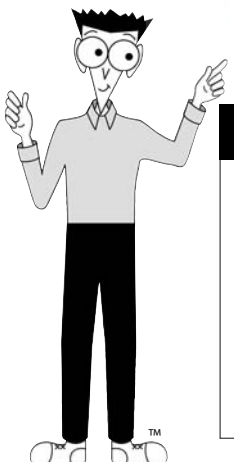

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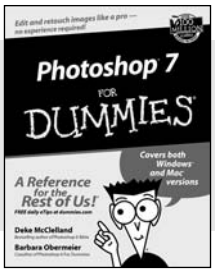

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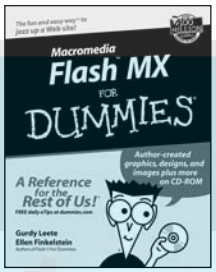

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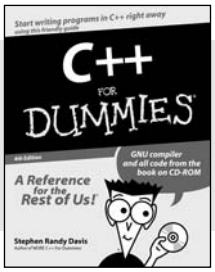

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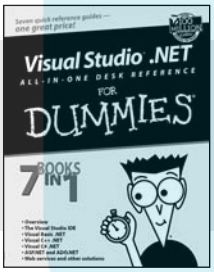

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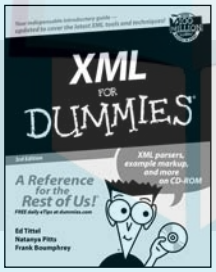

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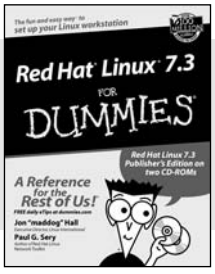

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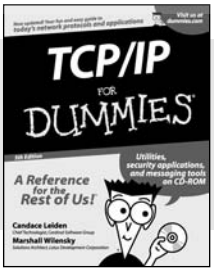

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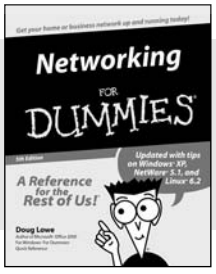

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